

THE IRON AGE

Editorial and Executive Offices
239 WEST 39TH STREET, NEW YORK, N. Y.

Owned and Published by



CHILTON COMPANY
(Incorporated)

Chestnut and 56th Sts., Philadelphia, Pa.
239 West 39th Street, New York, N. Y.

OFFICERS AND DIRECTORS

C. A. MUSSELMAN, President

FRITZ J. FRANK, Executive Vice-President

FREDERIC C. STEVENS, Vice-President

JOSEPH S. HILDRETH, "

GEORGE H. GRIFFITHS, "

EVERIT B. TERHUNE, "

ERNEST C. HASTINGS, "

WILLIAM A. BARBER, Treasurer

JOHN BLAIR MOFFETT, Secretary

JOHN H. VAN DEVENTER

JULIAN CHASE

THOMAS L. KANE

CHARLES S. BAUR

G. CARROLL BUZBY

P. M. FAHRENDORF

FRITZ J. FRANK

President

J. H. VAN DEVENTER

Editor

C. E. WRIGHT

Managing Editor

R. E. MILLER
Machinery Editor

F. J. WINTERS
Art Editor

A. I. FINDLEY

Editor Emeritus

T. W. LIPPERT
Metallurgical Editor

Associate Editors

F. J. OLIVER

N. E. MACMILLAN

R. G. BINGHAM

G. RICCIARDI

F. JURASCHEK
Consulting Editor

Washington Editors

L. W. MOFFETT

MORGAN FARRELL

Resident District Editors

T. C. CAMPBELL
Pittsburgh

R. A. FISKE
Chicago

F. L. PRENTISS
Cleveland

W. F. SHERMAN
Detroit

Editorial Correspondents

F. B. RICE-OXLEY
London, England

ROBERT G. MCINTOSH
Cincinnati

G. FRAZAR
Boston

P. FIDRMUC
Hamburg, Germany

L. E. MEYER
Milwaukee

LOREN G. IRWIN
San Francisco

F. SANDERSON
Toronto, Ontario

ASA ROUNTREE, JR.
Birmingham

LEROY W. ALLISON
Newark, N. J.

ROY M. EDMONDS
St. Louis

F. T. TURNER
Buffalo

Contents — April 29, 1937

The Sacred Bull	35
Electric Furnace Cast Iron	36
Alloying Cupola Gray Cast Iron	43
Some Problems in Non-Ferrous Foundry	46
Foundry Conveyor Features Compactness	48
Cost Factor in Heavy Crane Economy	50
Labor Shortage Stimulates Castings Demand	54
New Equipment	58
Automotive Industry	60
Statistics on Metal-Working Activity	64
Rate of Activity in Capital Goods	65
Washington News	66
NEWS CONTENTS	74
Plant Expansion and Equipment Buying	121

New Industrial Literature	127
Just Between Us Two	153
Products Advertised	154
Index to Advertisers	178

Copyright 1937 by Chilton Company (Inc.)

C. S. BAUR, General Advertising Manager

A. H. DIX, Manager Reader Service

Member, Audit Bureau of Circulations

Member Associated Business Papers

Indexed in the Industrial Arts Index.

Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, \$6.00; Canada, \$8.50; Foreign \$12.00 a year. Single copy, 25 cents. Cable Address, "Ironage, N. Y."

ADVERTISING STAFF

Emerson Findley, 621 Union Bldg., Cleveland

B. L. Herman, Chilton Bldg., Chestnut & 56th Sts., Philadelphia, Pa.

H. K. Hottenstein, 802 Otis Bldg., Chicago

H. E. Leonard, 239 W. 39th St., New York

Peirce Lewis, 7310 Woodward Ave., Detroit

C. H. Ober, 239 W. 39th St., New York

W. B. Robinson, 428 Park Bldg., Pittsburgh

D. C. Warren, P. O. Box 81, Hartford, Conn.

Ryerson Flame Cut Plates Lower Mfg. Costs

*Intricate Parts Quickly Cut
from Steel Plates...All Grades*

Manufacturers using Ryerson flame cut plates are saving both time and money. Strong rolled steel parts are quickly and accurately cut from mild, high carbon, or alloy quality steel. Experienced Ryerson operators with modern and complete equipment can produce any number of pieces to the most exacting specifications.

Large stocks of steel assure immediate production of your requirements. Let us show you what this Ryerson Service can save you. Send sketch or blue print for quotation and ask for Bulletin 88 which shows many parts now being produced by this method.

JOSEPH T. RYERSON & SON, INC.

Chicago, Milwaukee, St. Louis, Cincinnati, Detroit,
Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

Side frame for press.
One of four furnished.
Cut from plates 6" thick
by 51" wide and 111"
long, weighing 20 tons.

RYERSON STOCKS OF STEEL AND ALLIED PRODUCTS ALSO INCLUDE:

Bars, Shapes
Structurals
Rails, Plates
Sheets—Steel, Copper Alloy—
Plain, Galv. and Corrugated

Rivets, Bolts
Nails, Wire
Chain
Turnbuckles
Shafting

Mechanical Tubing
Boiler Tubes
Boiler Fittings
Concrete Reinforcing
Welding Rods

Solder
Refined Iron
Stainless Steel
Babbitt

Alloy Steel
Tool Steel
Floor Plates
Safety Treads

RYERSON

THE IRON AGE

ESTABLISHED 1855

APRIL 29, 1937

Vol. 139, No. 17

The Sacred Bull

YOU have heard about the sacred cows of the Hindus, now you are going to learn about America's Sacred Bull.

The Hindus make the cow a privileged and protected animal. It is given the right to do as it pleases, when it pleases. It is protected from the actions of people. But people are not protected from the actions of cows.

In India, where the cow is sacred, if one should happen to run amuck, there is nothing to do about it except to get out of its way.

No Hindu would think of striking a cow even in self-defense, for that would mean serious trouble with the authorities.

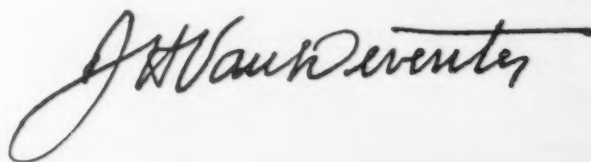
Some enlightened Americans might regard this Hindu viewpoint and practice concerning cows as being rather extreme. We would say that it is justifiable to protect animals, either wild or domestic, but that surely people should be given the right to protect themselves from vicious animals when the need arises.

America has, as a matter of fact, outdone the Hindus. The cow is a peaceful and inoffensive creature that seldom resorts to violence. One cannot say this concerning the cow's conjugal partner. In America we have established the Order of the Sacred Bull.

Congress did just that when it passed the completely one-sided Wagner labor relations act. This gives to rampant labor leaders an unrestricted privilege of action in attack and takes from capital, management and independent labor the right of reasonable action in defense.

Senator Wagner's Sacred Bull has already crossed the Canadian border, fired with the ambition to conquer the new world. There may be territorial limits to the ambition of India's sacred cow; there are no limits apparently to the ambition of America's Sacred Bull.

History records that conquerors of peoples have ridden to victory on horses and on elephants. Will a new conqueror of North America ride to hitherto unparalleled power on the back of Senator Wagner's Sacred Bull?



Electric Furnace Cast Iron . . .

Selection and Use of Furnaces—Metallurgical Aspects—Wear Resistance, Strength and Density Characteristics—Melting of Heat and Corrosion-Resistant Irons.

By C. H. MORKEN



THOSE who have given thought to the matter have been filled with wonder, if not with resentment, that cast iron has not as a whole received more technical consideration. Until comparatively recent years the library yielded pitifully little new and useable information on the subject, and the methods of manufacture of cast iron differed little from those used 200 years ago.

During the last 20 years the automobile, more than any other factor, created demands for better metals and for new alloys with properties which would make possible the practicability of new designs. With this impetus, rapid strides were made in the development and heat treatment of steel, the result being a tremendous improvement in the quality of steels of all kinds. Bearing metals and aluminum alloys also kept pace with the automotive engineer, who still paid scant attention to cast iron. He demanded nothing more of it than cylinder blocks, pistons and clutch disks of given hardness,

and the Brinell range tolerated was wide.

This interest in metals did, however, produce a new group of scientists, the physical metallurgists—but even after they had grown to proportions which supported an active national organization of their own, cast iron still was neglected and its potentialities were overlooked.

It seems that the automobile may also be credited with eventually propelling cast iron into the limelight. Higher compression ratios and higher speed engines required stronger piston rings. Stronger piston rings were harder, hence the hardness of the cylinder bore was stepped up to decrease wear. Brake drums opened another door. Steel drums were found unsuitable for stopping the heavier cars traveling at higher speeds. They scored and warped. Cast iron was found to be better, and rapidly became standard on trucks, buses and some of the heavier passenger cars. Lighter cars followed suit with gratifying results to the driver and to the foundryman. The next step was to use

cast iron in camshafts, and this was so successful that cast iron crankshafts naturally followed. It is startling to realize that these developments have grown to wide commercial application within the last decade.

These developments intensified cast iron research and immediately focused attention upon the method of melting. Only two media, the cupola and the air furnace had been available. The former was, and still is, the cheapest known means of melting. It is, however, a process which inherently embodies many variables of operation, hence is difficult to control. The latter, while more expensive, provides much better control, but is rather inflexible since it is best applied to the production of large batches of one type of iron. About 10 years ago the electric furnace made a serious bid for recognition in the cast iron field, and has since firmly established itself as an ideal means for producing "engineered cast iron," an alloy that is made to meet any of a wide variety of specifications.

The electric furnace makes pos-

¹ J. W. Bolton, "Gray Cast Iron."

sible melting the iron without the use of fuel and without subjecting it to the products of combustion of the fuel. It produces much higher temperatures than can be obtained with any fuel, and it offers a means of melting under both controlled atmospheres and slags. In other words, it has provided the iron foundryman with what may be termed a tool for *controlling* and producing an unlimited variety of compositions of iron at any desired temperature within the limits of available refractories.

Three Types of Furnaces

There are three types of electric furnaces in use for melting cast iron, the indirect arc rocking furnace, the direct arc (three phase) furnace, and the high frequency induction furnace. The latter is least frequently used for iron melting, due primarily to its high initial cost. In this type of furnace, the charge is placed in a crucible which may or may not be removable, and around which is wound a hollow water cooled copper coil. This assembly usually is set in insulation around which is a container. With non-removable crucible the furnace tilts for pouring. When an alternating current of high frequency (usually 900 cycles or more) is passed through the coil a current is induced in the charge, and the charge is melted by heat generated by its own resistance to the passage of the induced current. Rather elaborate equipment is required to change the frequency of the current from the conventional 25 or 60 cycles to the high frequency, and, because of this, the furnace is expensive and is not much used

for iron melting outside of laboratories.

The indirect arc furnace melts with an arc between two horizontal electrodes (see Fig. 1). The metal lies beneath and the arc never passes from the electrodes to the charge, hence the name. During melting and super-heating, the furnace rocks forward and backward, exposing new surfaces of metal to the arc and creating a positive mixing action. Melting is done in a closed chamber from which circulating air can be excluded. It is possible and usual to melt without slag coverings, and this is advantageous in promoting accurate control of the composition of cast iron.

In the direct arc furnace the arc plays between three vertical electrodes and the charge. After the charge is molten the arc passes from electrodes to the bath, arcing through the slag. Melting usually is done in the presence of slag forming materials which form a protective but reactive covering over the surface of the metal.

One of the first attempts to improve cast iron was by the addition of steel to the pig iron and scrap composing the charge. The object was to reduce the carbon content of the iron, and the name "semi steel" was applied to the product. This is an unfortunate misnomer, since the metal possesses none of the properties of steel. It is believed by many that "semi steel" is a superior cast iron, and it has too generally been considered synonymous with high test cast iron. Such is not the case; the name has no meaning and the use of steel in the cupola charge does not guarantee any improve-

ment in quality. With well regulated melting practice it produces a lower carbon iron than is ordinarily obtained with pig iron and scrap; with careless melting practice it is likely to produce an inferior iron. As the charge melts in a cupola, drops of metal pass through incandescent coke, and it is, therefore, difficult to control the carbon content of the iron, especially when the production is in limited quantities. Even though a 100 per cent steel charge be used the carbon content of the product is in the cast iron range.

In the electric furnace no carbon is obtained from a fuel bed. If only steel is charged into it, steel comes out. Steel, added to pig iron or cast scrap, reduces the carbon content of the melt by simple dilution. It reduces other elements in the same manner. Therefore, in the electric furnace the five elements ordinarily alloyed in cast iron, i. e., carbon, silicon, sulphur, phosphorus and manganese, are controlled by mixing together the proper amounts of materials which contain these elements in various known quantities. It is an arithmetical procedure. Knowing what properties irons of different analyses develop in castings of given type and size, the electric furnace operator can obtain those properties by carefully controlling the composition of the iron produced. Thus the iron foundryman takes a few pages from the book of the steel foundryman who, many years ago, adopted the electric furnace for and developed the operating technique for melting steel of unsurpassed quality. Since cast iron, after all, can be considered a steel in which is embedded a large amount of

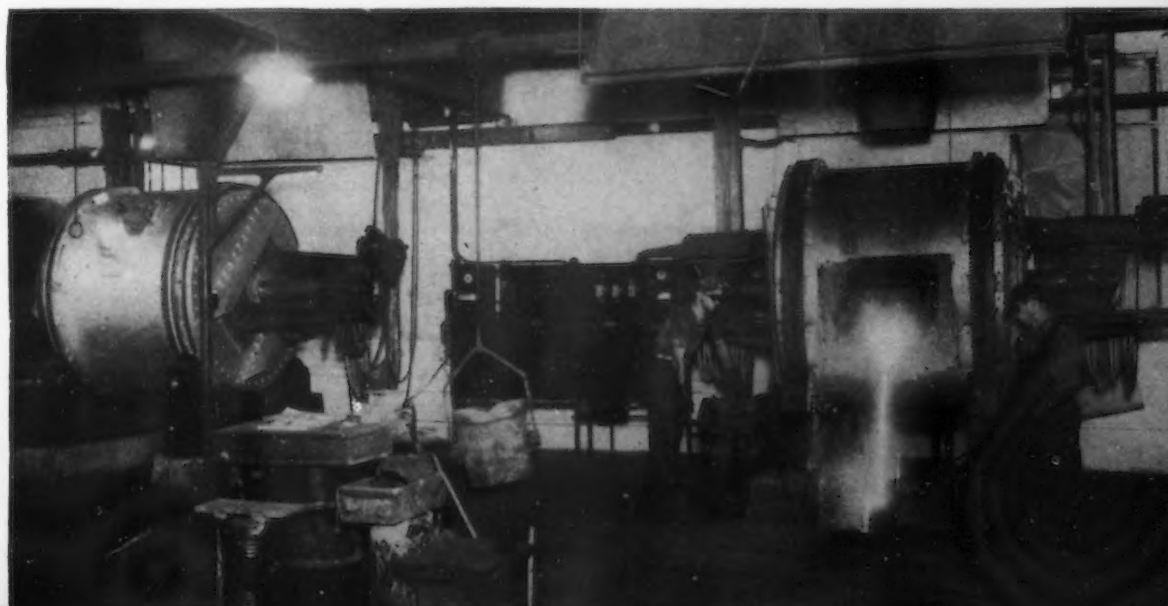


FIG. 1—The indirect arc furnace has horizontal electrodes above the metal bath, and there is no arcing between the electrodes and the metal. As the furnace rocks, the bath is completely mixed.

TABLE I

Freezing Point Data from Bolton

Based on data of Saeger and Ash, Transactions of the A.F.A., 1932

T.C.	Si	G.C.	C.C.	Mn	P	S	C plus 0.3 Si	Liquidus
3.69	2.87	3.53	0.16	0.59	0.68	0.03	4.55	2102
3.67	2.10	3.26	0.41	0.54	0.46	0.05	4.30	2102
3.39	2.86	3.20	0.19	0.58	0.67	0.03	4.25	2102
3.27	2.87	2.88	0.39	0.52	0.59	0.03	4.13	2111
2.90	2.88	2.68	0.22	0.44	0.66	0.03	3.76	2183
3.10	1.69	2.31	0.79	0.48	0.35	0.04	3.60	2282
3.08	1.68	2.18	0.90	0.44	0.35	0.04	3.58	2282
2.18	1.24	0.56	0.62	0.35	0.27	0.04	2.56	2462
2.08	0.84	0.00	2.08	0.24	0.15	0.06	2.33	2516
1.87	1.50	0.01	1.87	0.27	0.14	0.06	2.32	2489
1.98	0.85	0.00	1.98	0.25	0.14	0.06	2.23	2516

graphitic carbon, it is logical that the well established melting practices for steel should be applied advantageously to the production of an equally good quality of cast iron.

High Strength Not of First Importance

To many electric furnace iron signifies low-carbon iron, and improved or "high test" iron connotes high strength. This is not necessarily true. While low-carbon irons are suitable for many purposes, those of medium carbon content are of the most practical value. Also, high strength is the least useful of the many attributes of modern improved cast iron. Rather, the engineer uses other physical properties that have been found to accompany high strength iron. The outstanding characteristics of electric furnace iron can be summarized as follows:

(1) Dense, uniformly fine grained structure.

(2) Uniform hardness, especially with variations in thickness of casting.

(3) Smaller graphite particles, distributed uniformly through the sections.

(4) Thorough and complete assimilation of alloys.

(5) Strength as desired.

(6) Improved impact strength.

(7) Uniformity of structure, usually pearlitic, with comparative freedom from massive carbides.

(8) Excellent wearing qualities.

(9) Uniform machineability.

(10) A "tailor made" product built to develop in the casting itself the structure desired for a given purpose.

It has been stated that the electric furnace is a tool for *controlling* and producing an unlimited variety of compositions of iron. Therein lies its greatest value, and therein lies the basis for much of the improvement that has occurred in the service obtained from cast iron. It is not difficult to produce a set of desired properties in a casting when a knowledge of what creates those properties is accom-

panied by the means of making an alloy of the correct composition to develop them. Simultaneously obtaining high temperatures of superheat undoubtedly adds substantially to the end result, but it probably is the production of the correct carbon-silicon ratio that contributes most to obtaining the desired properties. Hand in hand with this is the intelligent use of alloys.

Fig. 2 is a reproduction of the Maurer diagram, which pictures the influence of the carbon-silicon ratio upon the structure of cast iron. It is based upon an average section of metal with average pouring temperature and cannot be taken too literally since the size of the casting, the type of mold, the pouring temperature and other variables enter into determining the structure that will be developed in a casting. If, for example, a horizontal line is drawn at 2.50 per cent carbon and vertical lines drawn to the base line from the intersections of this horizontal line with the four lines dividing the structural bands, there is secured a definition of the silicon range for each band at that carbon content. Thus, in a casting of average size, white iron is produced up to about 0.85 per cent silicon, and the mottled structure from there to 1.10 per cent silicon. The mottled range includes about 0.25 per cent silicon. The pearlite band exists between 1.10 per cent and 2.35 per cent silicon, with a range of 1.25 per cent; pearlite and ferrite exist together in the 0.55 per cent range up to 2.90 per cent silicon, while only ferrite presumably exists above that point.

If a second horizontal line is drawn at 3.50 per cent carbon, it is found that the width of the white iron band has been reduced from 0.85 per cent to 0.35 per cent, the mottled range from 0.25 per cent to about 0.15 per cent, the pearlitic band from 1.25 per cent to about 0.62 per cent and the mixed band from 0.55 per cent to about 0.28 per cent. Obviously at the higher carbon ranges, there is not much latitude between the center and the respective boundaries of each band. At 3.50 per cent carbon, the center of the pearlitic band is at 0.81 per cent silicon with only 0.31 per cent to the boundaries. As has been stated, this range is further influenced by the section of the casting with con-

TABLE II

Group of High Strength Irons

T.C.	Si	S	P	Mn	Ni	Cr	Mo	Bar	Trans- verse, in lb.*	Deflec- tion, in in.	Tensile, in lb. per sq. in.†
3.00	2.21	0.060	0.110	0.70	1.90	0.37	0.70	1	3955	0.300	67,610
								2	3870	0.277	65,140
3.10	2.18	0.061	0.150	0.70	1.65	0.35	0.60	1	4125	0.334	70,090
								2	3695	0.314	68,695
3.05	2.16	0.046	0.080	0.63	1.68	0.40	0.59	1	3635	0.385	68,365
								2	3535	0.370	65,405
3.01	2.14	0.047	0.054	0.72	1.87	0.30	0.62	1	3835	0.385	68,065
								2	3910	0.425	68,435
3.01	2.17	0.075	0.110	0.64	1.73	0.37	0.60	1	3620	0.292	68,785
								2	3945	0.300	69,755

*Transverse tests made on 1.20-in. bar on 18-in. centers.

†Tensile bars machined from broken section of 1.20-in. bar.

comitant differences in freezing and cooling rates, and by the presence of alloying elements, such as nickel and chromium, which work with or against silicon in effect. It is obvious, therefore, that in the usual carbon range it is difficult to obtain a pearlitic structure that is free from carbides or ferrite and that good control of the composition of the iron is essential to realize the desired structure. While it may seem that it is safer to stay in the lower carbon range, which irons undeniably produce high strength, other factors influence the choice.

The carbon and silicon contents have a pronounced effect upon the fluidity and "feeding" properties of the iron. It is well known that irons near eutectic composition have the greatest fluidity. In an iron containing 2.00 per cent silicon the eutectic point is at about 3.60 per cent carbon. Obviously, with other factors remaining constant, the low-carbon hypoeutectic irons are less fluid than those more nearly at eutectic composition, hence are not suitable for thin castings. If an iron is of such type as to freeze over a narrow temperature range, it is difficult to feed castings poured from it to compensate for liquid shrinkage. To put it conversely, with pouring temperature and graphitization rate remaining constant, the soundest castings should be produced from irons having the widest freezing range. The use of this premise must be accompanied by good judgment, since such irons may contain too much silicon for use in heavy castings. If such is the case,

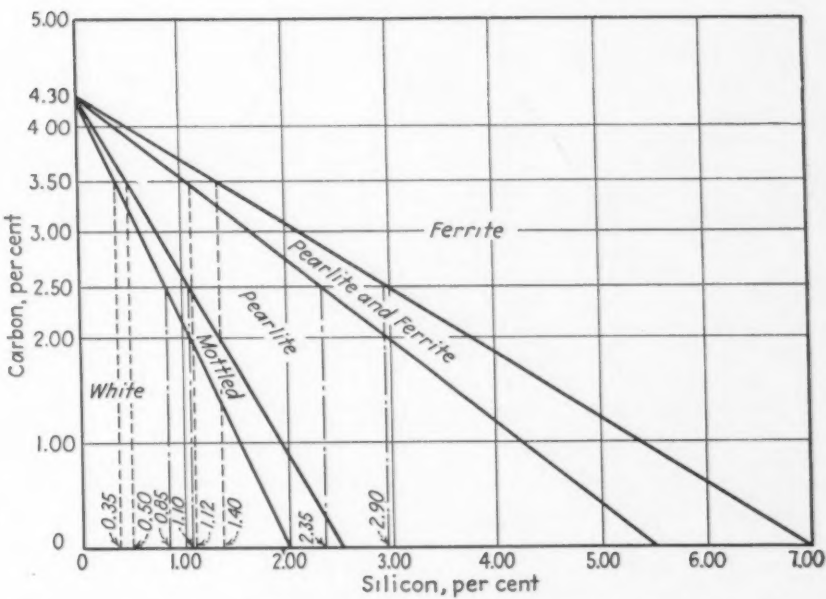


FIG. 2—The Maurer diagram, which pictures the influence of the carbon-silicon ratio upon the structure of cast iron.

excessive graphitization occurs due to the metal remaining fluid longer and requiring longer time to cool below the temperature at which graphitization practically ceases (probably about 800 deg. F.). Bolton¹¹ illustrates freezing ranges in his arrangement of freezing point data by Saeger and Ash. Table I reproduces Bolton's tabulation, which shows that the point of initial freezing (liquidus) increases as the C plus 0.3 Si decreases (total carbon percentage plus 0.3 times silicon percentage). Since the eutectic temperature is generally taken at 2102 deg. F., the table shows the freezing ranges of some irons.

It now is apparent that several factors are involved in selecting the proper composition of iron to produce sound castings having the desired structure and properties. It also is obvious that to produce and reproduce those properties reliably requires close control over the chemical composition of the melt. As a case in point, the desired strength, hardness, machineability and average density may be developed in a casting, but it may leak because of a spongy area. It is frequently impractical to eliminate the porosity with gating and risers, and a change in composition is required. Staying within the limits known to exist for

TABLE III
Analyses and Physical Properties of Some Electric Furnace Irons
(For microstructure see Figs. 3, 4, 5, 6 and 7)

Figure Number	T.C.	Si	S	P	Mn	Ni	Cr	Mo	Bar No.	Transverse Strength, in lb.*	Deflection, in in.	Tensile Strength, in lb. per sq. in.†
3	3.05	2.23	0.053	0.052	0.57	nil	nil	nil	1	2650	0.24	37,445
									2	2565	0.23	40,675
4	3.13	1.71	0.065	0.075	0.57	nil	nil	nil	1	2720	0.22	40,965
									2	2955	0.27	41,865
5	2.80	1.76	0.051	0.058	0.69	nil	nil	nil	1	3320	0.29	52,030
									2	2990	0.25	50,825
6	3.05	2.46	0.032	0.081	0.74	2.02	0.49	0.63	1	4775	0.40	69,700
									2	4350	0.35	70,410
7	3.08	2.07	0.062	0.065	0.70	1.50	0.53	nil	..	....	...	....

*Transverse tests made on 1.20-in. bar on 18-in. centers.
†Tensile bars machined from broken section of 1.20-in. bar.

the structure desired in the casting, the carbon and silicon are readjusted to produce the desired results.

Another point to be considered in determining the correct carbon content is machineability. Assuming an iron of pearlitic structure, the combined carbon necessarily is about 0.85 per cent. Therefore, in this pearlitic iron the lower the total carbon the lower will be the graphitic carbon and the iron will be more difficult to machine. It is probable also that a reduction of graphitic carbon impairs the wearing qualities of the iron in friction applications.

The most practical carbon range, where resultant physical properties and foundry properties are balanced, lies between about 2.75 per cent and 3.25 per cent carbon, although higher carbon irons are best for some purposes. The silicon is graduated to produce the desired structure in the castings involved. In the foundry with which the writer is connected a large tonnage of electric furnace iron is poured, and some 70 different "mixtures" are included. All of them have resulted from base irons of proper carbon-silicon ratio for certain types of castings, and a large majority of them are in the range of 2.90 per cent to 3.30 per cent carbon. Only in cases where high strength and density are re-

quired in massive sections is it found necessary to go as low as 2.75 per cent carbon. An interesting illustration of the importance of the carbon and silicon contents of iron is found in certain heavy-duty refrigeration castings. With the proper composition established to yield a balance between machineability and pressure-tightness in a valve casting, less than 0.50 per cent was lost due to leakers in several thousand made during three years. However, it was found while establishing the correct composition that as little as 0.10 per cent silicon made the difference between success and failure. When this element ran 0.10 per cent too high, noticeable porosity resulted; when it ran 0.10 per cent low, hard spots were likely to appear.

Electric Furnace Irons Classified

A number of electric furnace irons classified according to strength are illustrated in Figs. 3, 4, 5 and 6. Complete chemical analyses and physical properties of these irons are shown in Table III. These irons were made to meet A.S.T.M. Specification A48-35T, Classes 30, 40, 50 and 60, respectively. Fig. 7 shows a nickel-chromium iron used for the rotors and housings of centrifugal pumps for coal mines; it runs 40,000 to 45,000 lb. per sq. in. minimum tensile strength and is very tough.

The irons in Figs. 3, 4, 5 and 7 all are of 220 Brinell, while that in Fig. 6 runs about 250. The properties reported are from the standard 1.20-in. bar cast horizontally in green sand. The tapping temperatures were from 2950 deg. to 3050 deg. F.

In the unalloyed irons there is a noticeable gradation of graphite as the iron becomes stronger, and the uniformity of distribution and small flakes are characteristic of good electric furnace iron. The matrices are of fine pearlite with freedom from cementite and ferrite. The nickel-chromium iron of Fig. 7 shows substantially the same structure and division of graphite as are found in Fig. 4, which represents the same strength unalloyed. The hardness is also about the same. This illustrates that substantially the same physical properties can be obtained with two types of iron. The chemical compositions, however, disclose that the two irons may not be suitable for the same castings, the nickel-chromium iron being a much better iron for light sections. Both the higher silicon and the nickel promote softness and freedom from chilled edges. The nickel-chrome-molybdenum iron shows a desirable dispersion of fine graphite in a matrix that is well on the sorbitic side. This composition is likely to develop cementite in cast-

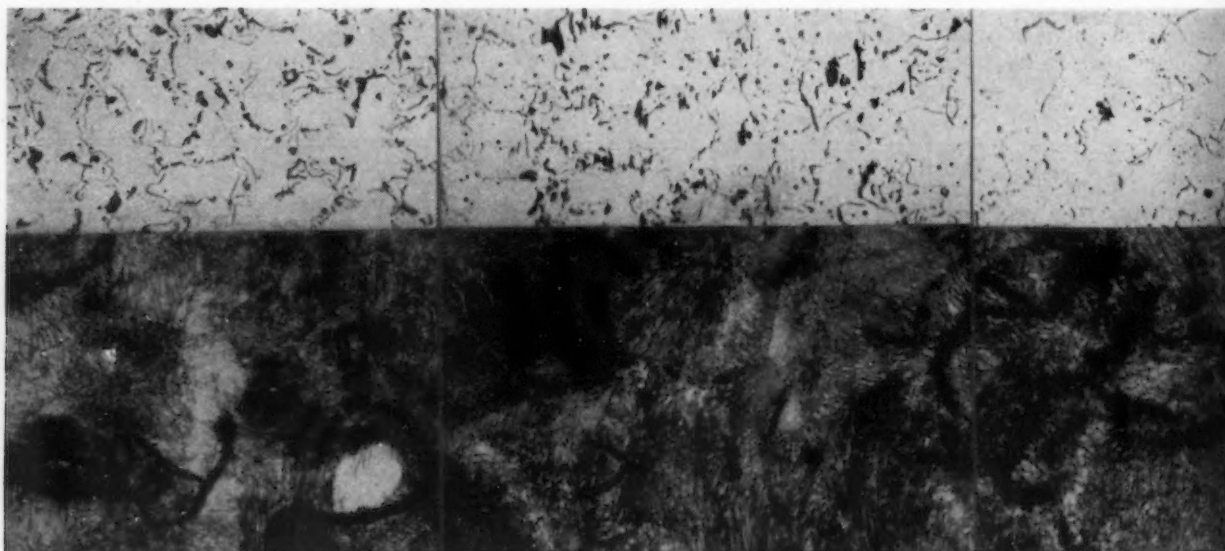


FIG. 3—Unalloyed electric furnace iron: (Above) showing graphite, unetched, at 100 diameters; (below) showing well developed fine pearlitic structure, nital etch, at 500 diameters.

FIG. 4—Unalloyed electric furnace iron: (Above) graphite formation, unetched, at 100 diameters; (below) good pearlitic matrix, nital etch, at 500 diameters.

FIG. 5—Unalloyed (Above) very fine at 100 diameters; benital etch, at

ings as light as the 1.20-in. test bar, and some show in the illustration. This is an exceptionally fine iron for machinery parts requiring strength and improved shock resistance. It is suitable for pouring heavy sections, yet does not cause severe machining trouble in fairly light castings. By using the same alloy combination in irons of different carbon-silicon contents, the same high physical properties can be developed in castings of a wide variation of section and mass.

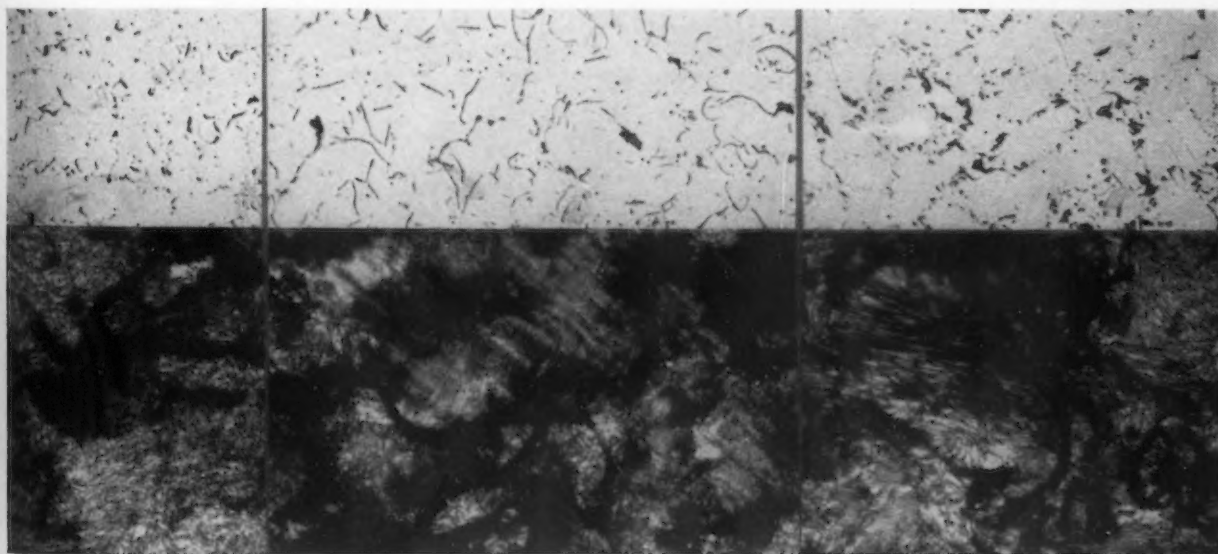
It has previously been stated that high strength is probably the least used of the properties of electric furnace iron. One reason for this is that the designing engineer has not yet realized that cast iron really has been improved and is a thoroughly reliable engineering material whose properties can be repeated with precision. Table II gives the properties and analyses of a representative group of a large series of electric furnace melts that were produced under Naval inspection. All were in excess of the minimum specification of 60,000 lb. per sq. in. tensile, and not a single heat was rejected because it failed to meet a chemical specification which allowed little variation. Since the design of the machine in which the castings were used was based upon the specified strength, the test bars

were rigorously checked by a Naval inspector. An example of utilization of high strength cast iron is a frame of a punch press used for perforating shoe uppers. Made of ordinary "semi steel," these frames frequently broke in service. Increasing the size of the frame was impractical since it would necessitate complete redesign of the press. Steel castings seemed the only answer until a high strength (55,000 lb. per sq. in.) electric furnace alloy iron was tried. To test it out, steel sheets were punched in increasing thickness. One of the dies eventually broke, but no damage resulted to the frame. The ultimate load was calculated to be 100 tons, which was four times the load that was causing failure of the previous frames. At the point of fracture the stress was tensile, but there also was considerable impact stress. Assuming that the original material was about 30,000 lb. per sq. in. tensile strength, as shown by test bars, the load required to cause failure in straight tension would be on the order of 300 tons, since the area at the fracture was about 20 sq. in. Yet a lower load did cause failure! On the other hand a material apparently less than twice as strong sustained four times the load. The likely explanation is that the original material was not of 30,000 lb. per sq. in. tensile in

the casting. The electric furnace iron was carefully designed to develop high strength in the rather massive casting, and in addition was alloyed with molybdenum to increase its impact strength.

To illustrate how other properties of electric furnace iron are used to improve the service obtained from iron castings, a few representative application groups have been selected. In many cases better performance is obtained from an unalloyed iron of the proper composition for the job; in other cases it is obtained by the judicious use of alloys. Intelligently used, alloys make a good iron better, but they cannot make a poor iron good. The electric furnace is the ideal means of using alloys since it provides the means for preparing the proper base metal for alloying, it supplies the temperature and mixing action necessary for their complete assimilation, and it makes possible the control of melting atmosphere which insures accurate control of the alloy content.

Ed. Note—Next week the author will complete this discourse on electric furnace iron, with descriptions of the making of wear, heat and corrosion resisting irons, and with an additional mention of the effect of electric melting on strength and density.



electric furnace iron: graphite, unetched, low) fine pearlite, 500 diameters.

FIG. 6—Nickel-chromium-molybdenum high-strength iron: (Above) very fine graphite, some nodular, unetched, at 100 diameters; (below) sorbo-pearlitic matrix, nital etch, at 500 diameters.

FIG. 7—Nickel-chromium iron—compare with Fig. 4. (Above) shows graphite form, unetched, at 100 diameters; (below) well developed pearlite, nital etch, at 500 diameters.



CRAFTSMANSHIP combining both mental and physical development of high order is represented in this striking picture of "The Molder." This unusual photographic art study was made by L. B. Keller, of Clearwater, Fla.

o o o

Alloying Cupola Gray Cast Iron

By F. E. FISHER

Foundry Advisor, Chicago Office,
Gloss-Sheffield Steel & Iron Co.



IN many types of castings the use of alloys to improve the quality of cast iron is becoming more desirable and more necessary all the time. There are many alloys to which the foundryman may turn, and much progress is being made in perfecting suitable base mixtures in which to introduce those alloys.

The base iron must first be considered in order to derive the greatest good from the correct amount of alloy. When a foundry superintendent wishes to improve the quality of his product, he does not immediately purchase the more expensive alloys, expecting them to overcome troubles caused by lack of attention to some *fundamental principle of good foundry practice*, but he checks closely the quality of his raw materials both as to physical properties and chemical composition. He examines the operation and control of his cupola with particular attention to the weights and arrangement and size of the materials in each charge. Once he is convinced that these variables are correctly standardized and that his base iron is correct, he then knows that further improvement may be gained by the judicious and practical use of alloying elements in castings used for specific purposes.

The general run of base irons as

WHAT are the properties, uses and effect of alloys on cupola gray cast iron? These questions are answered in detail by the author in the accompanying review. Also included is a table showing the amount of alloying material to add to each 100 lb. of metal and a table which lists the approximate analysis to use for each of 61 different applications of gray cast iron.

they come from the cupola may range from 20 to 80 per cent scrap in mixture, some containing as much as 70 per cent steel, some with 10 per cent pig iron and some with 60 per cent pig iron. The various percentage combinations of scrap, returns, steel and pig iron used are numberless. Yet each combination is made up with a definite casting analysis in view.

The casting analyses are as varied in number and chemical composition as the base mixtures. Each foundryman may differ in his idea of what constitutes the ideal base iron and the ideal chemical analysis he hopes to get.

The casting analyses guide, shown in Table 1, lists a variety of castings and, also, indicates an approximate analysis which may be used as a guide in making up the base mixture for the particular variety of casting in question. It will be noted that the analyses guide mentions only the silicon, sulphur, phosphorus, manganese and total carbon. In many cases the silicon and phosphorus ranges are wide, but the author believes the limits shown cover the field and as a whole will average up fairly close to the present trend.

The more commonly used alloys are listed in the following paragraphs, and their effects on the physical properties of the cast iron are discussed briefly.

In most instances the alloys shown here may be added either in the spout or ladle and in some instances to the cupola charge. The method used in adding the alloys depends to some extent on the amount of iron to be alloyed, the size and alloy content of the alloying material and the amount required to get the desired results. Alloys are generally added to the charge when the melt is large or in production, and to the spout or ladle when the amount of iron to be treated is small. Many foundries run a continuous melt of six to eight hours and use one base mix throughout the entire day, alloy-

ing occasional ladles as needed on the pouring floors.

As the physical properties differ greatly in the alloys, care should be exercised in the selection, type,

size and amount added to the metal. Much expensive alloy is used today in castings which really do not require any, while on the other hand many castings would

be greatly improved with intelligent use of one or more of the alloys.

Chromium

Ferrochromium may be added in either cupola, spout or ladle. This material contains 65 to 70 per cent chromium and has a melting point of about 2300 deg. F. When used in the spout or ladle, 20 to 30 mesh size is most practical and recovery averages close to 90 per cent. When added in the cupola, lump ferro is generally used.

Chromium is sometimes introduced into the cupola charges in the form of briquets which contain two pounds of alloy, and in other cases in a chromium bearing pig iron containing approximately two per cent chromium. A 95 per cent recovery may be expected when briquets or chromium bearing pig iron is used. When briquets are used it is recommended that they be placed on the coke in the center of cupola.

Chromium is added alone or in combination with other alloys, mainly nickel, molybdenum or copper. Chromium is a hardener, and, as such has the tendency to increase chill and strength and is freely used in castings which are chilled or which require a white fracture with extreme hardness. Chromium increases the resistance to wear, heat, corrosion, and growth. It refines the grain, retards the formation of graphite, and increases combined carbon.

In the 1935 edition of the Cast Metals Handbook, it is pointed out that in heavy sections, the use of chromium helps to give a more uniform hardness with change of section.

Chromium additions reduce the graphitic carbon content and decrease the flake size. Chromium favors the formation of more finely laminated and harder pearlite. In a suitable base iron, these effects add to tensile strength, promote finer grain size, and increase hardness. The influence of chromium on the structure of soft cast iron is shown in Table II.

Copper

Copper is generally added to the ladle in its purest form as scrap or shot. Some foundries use copper pigs and make the additions in the cupola. The melting point is approximately 1950 deg. F. Copper tends to refine the grain struc-

TABLE I
Casting Analyses Guide

Approximate analyses of gray iron castings. These ranges are not specifications, but are sufficiently accurate to produce sound castings with good foundry practice. The sulphur recommendations are somewhat high, but the figures shown are maximums and, if proper balance of silicon, carbon, phosphorus and manganese is obtained, the maximum sulphurs should not be harmful. The lower carbons can be reached provided the base mixture is of proper materials and the cupola practice is good.

Castings	Silicon	Sulphur Max.	Phosphorus	Manganese	Total Carbon
Acid-resisting	0.90-2.00	0.06	0.40-0.50	0.70-1.10	2.80-3.10
Agricultural	2.00-2.50	0.09	0.80-1.00	0.55-0.75	3.30-3.60
Aluminum pots—goose necks	1.40-1.75	0.08	0.50-0.60	0.55-0.70	3.00-3.15
Annealing boxes	0.70-0.80	0.09	0.40-0.50	0.30-0.40	3.30-3.50
Bed Plates	1.40-1.80	0.11	0.60-0.80	0.75-0.85	3.25-3.50
Boiler Parts	2.00-2.50	0.08	0.50-0.60	0.70-0.80	3.25-3.40
Brick dies	0.40-0.80	0.15	0.60-0.80	0.50-0.70	2.90-3.15
Brake shoes	1.30-1.50	0.13	0.50-0.60	0.50-0.60	2.90-3.15
Brake drums	1.60-1.80	0.09	0.40-0.50	0.60-0.70	3.00-3.20
Car wheels, chilled mine	0.90-1.15	0.11	0.45-0.55	0.50-0.60	3.00-3.25
Caustic soda pots	0.80-1.10	0.07	0.40-0.50	0.60-0.80	2.80-3.10
Chills	0.80-1.10	0.07	0.40-0.50	0.60-0.80	2.80-3.10
Chilled crusher, head plates	0.70-0.90	0.09	0.40-0.50	0.70-0.90	2.90-3.20
Chilled rolls	0.65-0.85	0.08	0.40-0.50	0.50-0.70	3.00-3.25
Clutches	1.90-2.20	0.09	0.60-0.70	0.60-0.70	3.00-3.25
Cylinders, air	1.10-1.75	0.10	0.40-0.60	0.75-1.00	3.00-3.25
Cylinders, ammonia	1.10-1.75	0.10	0.40-0.60	0.75-1.00	3.00-3.25
Cylinders, automotive	2.15-2.30	0.09	0.30-0.35	0.60-0.80	3.10-3.25
Cylinders, gas engine	1.25-2.25	0.11	0.40-0.50	0.60-0.80	2.90-3.15
Cylinders, hydraulic	1.00-1.40	0.10	0.35-0.50	0.70-0.90	2.90-3.15
Cylinders, locomotive	1.10-1.40	0.10	0.35-0.50	0.70-0.90	2.90-3.20
Cylinders, motorcycle	2.50-2.90	0.09	0.50-0.60	0.60-0.80	3.25-3.50
Cylinders, steam and oil	1.40-1.80	0.10	0.40-0.50	0.60-0.80	3.00-3.25
Dies	1.00-1.50	0.09	0.30-0.40	0.60-0.80	3.00-3.25
Electrical	2.60-2.90	0.07	0.70-0.90	0.60-0.70	3.30-3.60
Fire pots	2.00-2.30	0.08	0.80-0.90	0.60-0.80	3.10-3.30
Fly wheels	1.25-1.75	0.08	0.40-0.50	0.60-0.80	3.10-3.30
Furnace parts	2.00-2.50	0.08	0.70-0.80	0.60-0.80	3.10-3.30
Gears	1.50-2.00	0.08	0.70-0.80	0.60-0.70	3.20-3.40
Glass molds	1.75-2.25	0.08	0.25-0.35	0.70-0.80	3.30-3.50
Glass plungers	1.60-1.80	0.08	0.30-0.40	0.65-0.75	3.30-3.50
Grate bars	2.00-2.30	0.07	0.70-0.80	0.60-0.80	3.10-3.30
Grinding balls	0.75-1.25	0.12	0.40-0.50	0.40-0.60	3.25-3.50
Gun iron	1.15-1.35	0.08	0.40-0.50	0.70-0.90	2.90-3.10
Hardware	2.40-2.65	0.08	0.80-0.90	0.60-0.70	3.30-3.60
Heat resistant castings, light	2.00-2.40	0.08	0.70-0.80	0.60-0.70	3.00-3.25
Heat resistant castings, medium	1.50-2.00	0.08	0.70-0.80	0.50-0.60	3.00-3.25
High strength	1.50-1.80	0.10	0.40-0.50	0.75-0.90	2.75-3.00
Liners, heavy	0.85-0.95	0.12	0.50-0.60	0.75-0.85	3.00-3.20
Machinery castings, light	2.40-2.70	0.08	0.80-0.90	0.55-0.65	3.30-3.55
Machinery castings, medium	1.90-2.40	0.09	0.70-0.80	0.65-0.75	3.10-3.35
Machinery castings, heavy	1.40-1.90	0.10	0.60-0.70	0.75-0.85	2.90-3.15
Melting pots, lead	1.15-1.40	0.08	0.70-0.80	0.50-0.70	3.00-3.25
Mine wheels	1.10-1.30	0.10	0.70-0.80	0.55-0.65	3.00-3.20
Ornamental	2.40-2.75	0.08	0.80-1.00	0.60-0.70	3.35-3.60
Permanent molds	1.75-2.15	0.07	0.70-0.80	0.60-0.80	3.20-3.40
Piano plates	2.10-2.30	0.08	0.70-0.80	0.60-0.70	3.25-3.50
Piston, automotive	2.40-2.60	0.09	0.50-0.60	0.60-0.70	3.25-3.50
Piston rings, cupola	2.60-2.80	0.08	0.50-0.60	0.60-0.70	3.25-3.50
Plow points	0.80-1.10	0.09	0.60-0.70	0.70-0.80	3.30-3.40
Pulleys	2.00-2.40	0.09	0.60-0.80	0.60-0.70	3.30-3.50
Radiators	2.25-2.50	0.08	0.75-0.85	0.65-0.75	3.30-3.45
Rolls, sugar mills	2.50-2.75	0.08	1.00-1.25	2.00-2.50	3.35-3.60
Rolls, briquet	1.40-1.75	0.10	0.60-0.75	0.60-0.75	3.10-3.25
Rolls, dryer paper	2.00-2.20	0.10	0.60-0.75	0.70-0.80	3.15-3.35
Sand pumps	1.25-1.75	0.11	0.60-0.70	0.50-0.60	3.15-3.30
Steam fittings	1.70-2.10	0.09	0.55-0.65	0.60-0.75	3.15-3.30
Stove plate	2.35-2.55	0.08	0.70-0.90	0.50-0.65	3.40-3.60
Valves, small and medium	1.75-2.10	0.09	0.70-0.80	0.50-0.60	3.30-3.50
Valves, large	1.40-1.75	0.10	0.60-0.70	0.60-0.70	3.20-3.40
White iron castings	0.40-0.80	0.20	0.60-0.80	0.50-0.70	2.75-3.10

ture and decreases chill in light sections. Tensile strength is increased slightly with little or no effect on transverse strength. Up to 0.50 per cent, copper acts as a graphitizer and decreases chill, but from 0.50 up to 1.50 per cent hardness is increased. The formation of silicides with increased hardness is quite noticeable at 0.75 per cent. Copper is used with chromium, nickel or molybdenum or combinations of the alloys. Ni-Resist contains 6 per cent copper, 14 per cent nickel, and 2 per cent chromium. It is highly resistant to corrosion and growth at higher temperatures and is well adapted for castings used in chemical and oil refining equipment.

Manganese

Manganese is added to cast iron in many forms. It may be added in the cupola charges, spout or ladle and the method of addition is governed by the type of material used.

Cupola additions are made by using pig iron, lump ferro-manganese, spiegeleisen or manganese briquets. Spiegeleisen contains approximately 20 per cent manganese, lump ferro-manganese contains 70 to 80 per cent manganese, and the briquets contain two pounds of manganese and one-half pound of silicon per briquet.

For ladle and spout additions, the regular ferromanganese crushed to 20 mesh and under is generally used. The melting point of ferromanganese is 2250 to 2400 deg. F., and recovery averages 80 to 85 per cent.

Manganese promotes fluidity and soundness, increases tensile and transverse strength, is an excellent deoxidizer, softens cast iron up to 0.75 per cent and beyond that point, has little effect on hardness until 1.25 per cent is reached when it increases the hardness. Manganese is liberally used when sulphurs are high.

Molybdenum

Additions of ferromolybdenum to cupola cast iron are generally made in the ladle using material crushed to 20 mesh or less. Lump ferromolybdenum may be charged in the cupola, but this method is not considered best practice.

Ferromolybdenum contains 60 to 70 per cent molybdenum and melts at a temperature of about 2750 deg. F., but is quite soluble in



THE casual addition of alloys to gray iron is by no means a cure-all for the foundryman's many problems, and should never be considered as such. However, once a melter has standardized his plain iron practices on a high level, he then should seek further improvement in spout iron through a judicious and practical use of alloying elements. The workman shown here is alloying spout metal in the foundry of the Warner & Swasey Co.

cast iron. A recovery of 90 per cent may be expected.

Molybdenum is also a carbide forming alloy as well as a deoxidizer. It increases the tensile, transverse and compressive strengths, refines the graphite and promotes a close grain with a "satin" appearing fracture. Brinell hardness is increased with slightly decreased machineability. Molybdenum increases resistance to wear

and heat, reduces shrinkage and porosity, and castings may be heat treated easily. Molybdenum is often used with nickel or chromium or both.

Nickel

Nickel is added to cast iron as pure nickel, "F" nickel shot, or as nickel pig. For ladle and spout additions the nickel shot (which melts at 2300 deg. F.) is used. This
(CONTINUED ON PAGE 123)

TABLE II

Approximate effect of chromium on a soft cast iron

(TABLE II)

Chromium, per cent	Structure
0.0	ferrite and coarse graphite.
0.30	less ferrite and finer graphite and pearlite.
0.60	Fine graphite and pearlite.
1	fine graphite and pearlite and small carbides.
3	graphite disappears.
5	much massive carbide.
10 to 30	fine carbides

o o o

IN a non-ferrous foundry, the selection of the proper alloy for a specific purpose is of vital importance. This particular foundry is pouring small propellers and is using Monel Metal to secure strength, corrosion resistance and high finish. Many foundries melt Monel in electric furnaces, although some employ gas, oil or coke-fired crucible furnaces to obtain the required temperature of 2850 deg. F.

o o o



Some Problems in the



HAVING in mind that considerable research work is being done in the solution of non-ferrous foundry problems, it is the purpose of this paper to contribute a few experiences in connection with the use of composition ingot metal for the production of sand castings.

Among the many problems confronting foundrymen, the selection of the proper alloy for a specific use is of vital importance. For example, in a foundry engaged in the production of pump bodies of anti-acid metal, having a composition of 75 per cent copper, 15 per cent lead, and 10 per cent tin, a complaint was received from one of their customers who had purchased a pump that failed after being in service only a few months. This copper-lead-tin alloy was developed primarily to meet the demands for a metal to resist the corrosive

action of mine water containing a small percentage of sulphuric acid. This particular pump was in service in Bermuda and it was necessary to handle the problem by correspondence.

In the subsequent investigation, the defective pump parts were subjected to chemical tests and the corroded surfaces were found to contain approximately 3 per cent less lead than existed in the original castings.

An analysis was then made of the pump water, which revealed that it was in reality sea water and contained a large percentage of soluble chlorides. It was quite clear that this was responsible for the failure of the pump, as metal of such composition was not intended to operate in salt water. This is because of the strong affinity that chlorine has for lead.

The pump was replaced with a copper-tin bronze, having a composition of 88 per cent copper, 10 per cent tin and 2 per cent zinc, and

after many months had elapsed the pump was still operating satisfactorily. Had the nature of the water been known, the leaded bronze would not have been used and the failure of the pump would have been averted. In this instance, the selection of the proper alloy was not made, due to the fact that the true operating conditions were not known.

Another somewhat similar example was encountered in a foundry engaged in the production of meter bodies and parts, with an alloy consisting of 85 per cent copper, 5 per cent lead, 5 per cent tin and 5 per cent zinc. This company received several complaints from failure of the meters in service. Investigation showed these failures to be due to a white deposit forming on the inside of the meters, this deposit accumulating to such a thickness that the meters would not record properly and had to be removed from service and replaced.

Since the meters that failed

*Presented before the Philadelphia Chapter of the American Foundrymen's Association, Feb. 12.

were in service at far distant points, it was first thought that the composition of the water in these localities was directly responsible. However, a series of experiments was outlined, which it was hoped would throw some light on the subject. Several rough castings were selected for test and were filled with ordinary city supply water and allowed to stand. A white deposit formed almost immediately. This test was then repeated with chemically pure water with the same result. A sample of this white deposit was collected and analyzed, and it was found to be carbonate of lead. This deposit, therefore, could only be formed by the carbon dioxide in the atmosphere being absorbed by the water and reacting with the lead to form lead carbonate.

Subsequent tests were made to determine to what extent the lead content should be decreased to prevent the formation of the lead carbonate deposit. After numerous tests with alloys containing various

the center of the mold. This made it necessary for the pourer to raise the ladle to an elevation of about 7 or 8 in. above the sprue, with the result that when the brass was poured in this manner, the metal was greatly agitated and excessive dross was formed. This does not occur when gray iron is poured under the same conditions.

On every occasion, it is recommended that for brass castings, the gating be changed and that the gates be located on the edge or the end of the pattern, so that the pouring ladle can be held sufficiently close to the sprue, thus minimizing agitation of the metal. This example clearly indicates that brass castings cannot be successfully produced by the same method of gating as is employed for gray iron.

An example of the improper use of fluxes may be clearly shown by consideration of the following problem and its solution:

In a foundry engaged in the production of miscellaneous valves and

consisted of oil fired open flame tilting furnaces of 1000 lb. capacity. The metal was transferred to ladles holding approximately 200 lb. of metal and thence to the sand molds.

This foundry reported having difficulty over a long period of time during which they purchased composition ingot metal from nearly all of the large producers. Requests for service were made in almost every instance, and this resulted in representatives of the various ingot metal manufacturers visiting them and investigating their difficulties. In almost every case the customer was advised to add a flux of some nature to the metal with the assurance that the trouble would thereafter cease. This practice was continued, until at the time of the first purchase of Ajax metal, they were adding as many as eight different fluxes to each heat. In addition to this, it was their practice to calculate a theoretically perfect 85-5-5-5 furnace charge, which made necessary

o o o

By R. J. KEELEY
Metallurgist, Ajax Metal Co.

o o o

Non-Ferrous Foundry*

percentages of lead, it was found that a composition of 86 per cent copper, 3 per cent lead, 3 per cent tin and 8 per cent zinc could be used without the formation of this deposit. Such an alloy was recommended to this foundry for all future castings to be used in contact with tap water, and an added suggestion was made that the entire subject be investigated from a health standpoint because of the ill effects of lead on the human system.

The Ajax company sometimes receives calls for service from companies operating brass foundries in conjunction with gray iron foundries. In a number of instances their difficulties have been due to attempts to produce brass castings with the same pattern equipment used for gray iron. On several occasions, the Ajax company has conducted investigations in regard to this and has found that the pouring sprues were located directly in

fittings, with an alloy of 85 per cent copper, 5 per cent lead, 5 per cent tin and 5 per cent zinc, a considerable percentage of castings were found to be defective due to porosity. Their melting equipment

THE many pernicious difficulties incident to the production of sound non-ferrous castings has troubled many a foundryman. What some of these problems are and how they best can be solved are the concern of this discourse by Mr. Keeley. If close inspection of defects does not disclose the root of the trouble, the recommendation is that standard foundry practices be set up and various variables changed in controlled amounts so that suspicion can be directed in the proper direction.

the addition of small amounts of virgin metals to the composition ingot, notwithstanding the fact that their analysis of the ingot metal supplied them was well within the allowable limits of their specification.

The data in Table I is a typical furnace charge for their 85-5-5-5 mixture being used at the time:

TABLE I
Typical Furnace Charge for Valves and Fittings

85-5-5-5 ingot	440 lb.
85-5-5-5 gates	350 lb.
85-5-5-5 borings	140 lb.
Electrolytic copper	57 lb. 1 oz.
Tin	5 oz.
Lead	4 lb.
Zinc	18 lb. 13 oz.
Boron copper	5 lb.
50-50 copper-nickel shot	5 lb.
Calcium chloride	6 lb.
Borax	2 lb.
Salt	2 lb.

To each ladle the following additional fluxes were added:

15 per cent phosphor-copper shot	2 oz.
Lead oxide	2 oz.
Charcoal	(approx.) 3 oz.

Upon further investigation, it was found that most of the defective castings were due to slag inclusions which no doubt were

(CONTINUED ON PAGE 126)

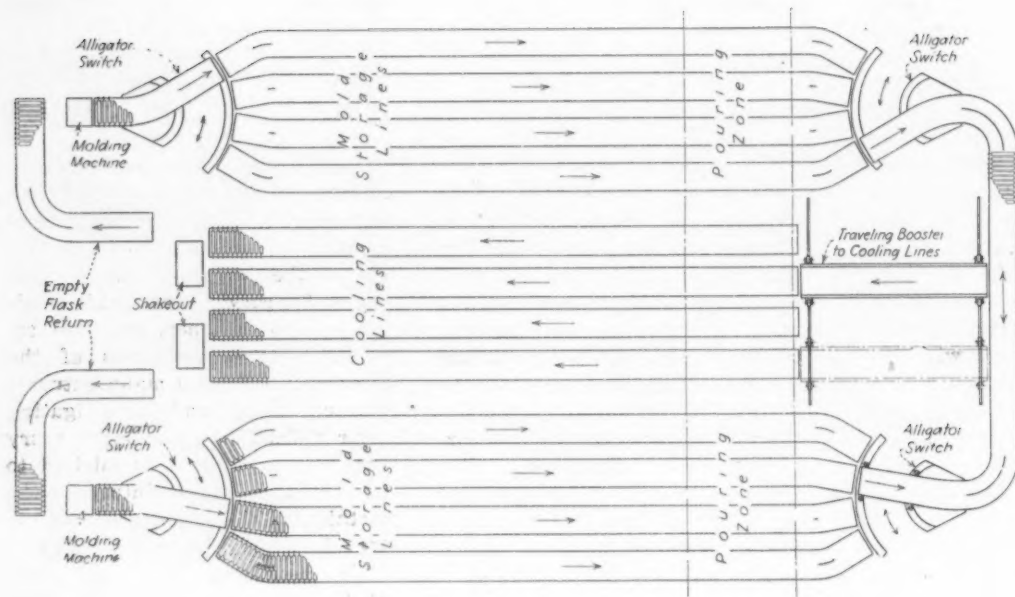


FIG. 1—Continuous flow to and from solved the flask storage problem in small space in this gray iron foundry.

Foundry Conveyor System Features



FLOOR space was at a premium in a medium size gray iron production foundry in New York State where thousands of electric refrigerator castings were in great demand. Flask storage, full or empty, presented a problem. Of several possible solutions, the handling system shown in plan form in Fig. 1 presented the most advantages from the standpoint of a complete utilization of the continuous flow principle, with all flask storage on the conveyors continuously. The compact design concentrates large production facilities within very small space, and the use of roller type conveyors made the resulting installation cost but a fraction of other proposed designs.

From each of two molding machines, with capacities of one mold per minute, the filled flasks are delivered over an alligator switch to any one of four parallel level storage lines of roller conveyors. As each storage line is filled, the flasks are gradually worked down

to the pouring zone at the opposite end of the lines, where pouring ladles are suspended from an overhead crane. After pouring the molds are taken through another alligator switch to a single line of roller conveyor which feeds the low end of a traveling booster. This booster is a power driven steel apron conveyor mounted on wheels running on tracks, and delivering at the high end to any one of the four lines of cooling conveyors running back through the middle of the room to the shakeouts, situated between the two molding machines. These cooling lines have just enough down grade to permit the molds to move by gravity toward the shakeout. At the shakeouts the sand passes through vibrating screens to the sand reclaiming system below, while the castings are transferred to an apron conveyor leading to the cleaning department. Empty flasks are returned on gravity conveyors to the molding stations.

Fig. 2 is a photograph taken at one of the molding machines, and

shows the alligator switch connected to the lowest storage line conveyor. In the middle background are shown the lines of cooling conveyors loaded with flasks containing freshly cast metal on the way to the shakeout.

Fig. 3 is a view from the far end of the room showing the single line of roller conveyor connecting the twin sets of four storage lines, and the power driven apron conveyor which lifts the casting-filled molds to the four lines of cooling conveyors leading back to the shakeouts. The flask storage system is clearly shown in these photographs; every single flask is in use all the time! A special feature of the alligator type switch is the fact that it automatically maintains all rolls in radial position at all times, thus eliminating the objectionable gap which occurs at the pivot end of the ordinary switch.

This conveyor system was designed, built and installed by the Logan Co., Louisville, Ky.

FIG. 2—Cores are set and molds closed on the alligator switch delivering to the four storage lines.



Compact Installation . . .



FIG. 3—Traveling booster apron conveyor delivers casting-filled flasks to four lines of cooling conveyors.

Costs After Installation Biggest

By FRANCIS JURASCHEK
Consulting Editor, The Iron Age



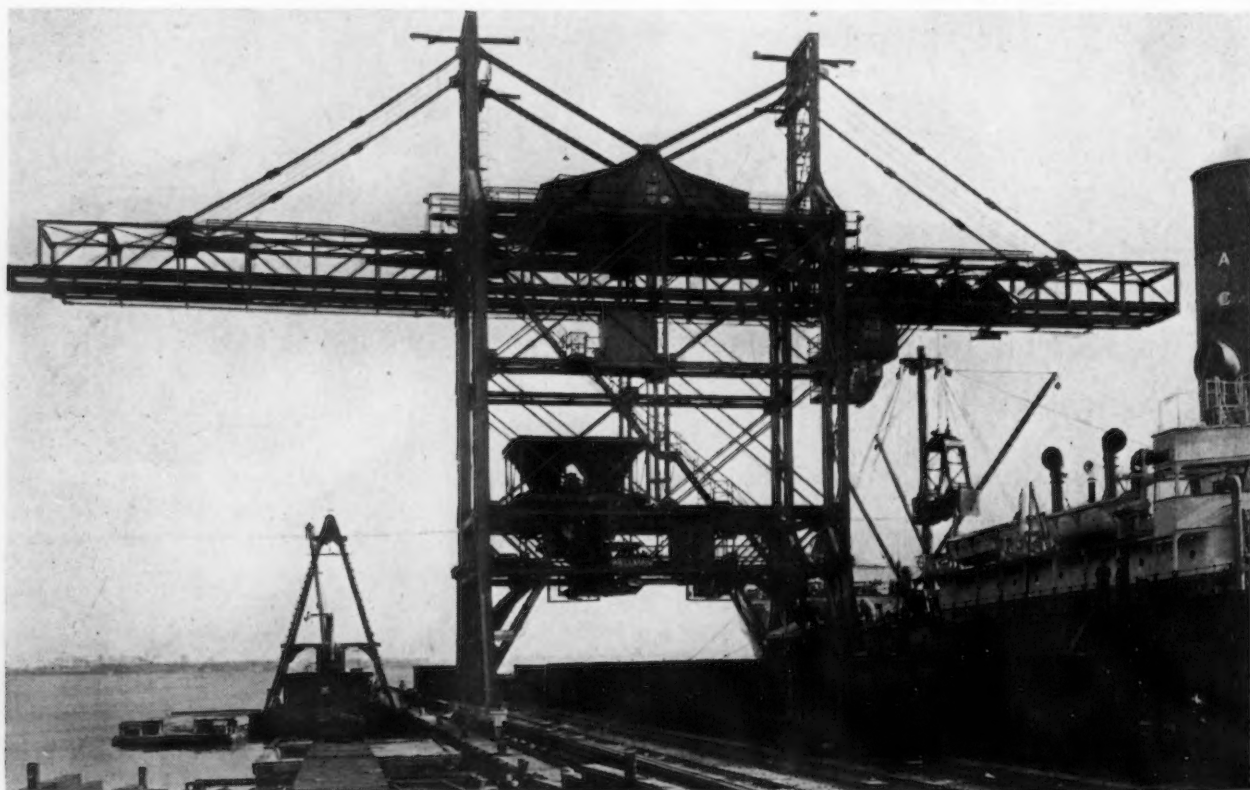
FOR no other item of materials handling equipment is the old saying about married life—"It isn't the initial cost, it's the upkeep that matters"—so pertinent as when applied to heavy cranes. Large as the investment must be for any big crane installation, in the long run the costs of operation and maintenance far outweigh that first cost. The matter is further complicated by the fact that, as between one crane and another, the upkeep costs may be double or treble, depending upon the design and construction features of the crane, its rating in terms of the service demanded, and its adaptability to handle most economically the jobs in the plant where it is installed.

Crane economy depends also on

the amount of time it is in use. While this factor may seem almost too elementary to mention, it is rather surprising to notice in many shops the idle time of the cranes installed. There is, of course, the point to be considered that when no job is there to be handled, quite naturally the crane must be idle; for one does not "make work" like a WPA organization, simply to keep a piece of materials handling equipment operating. This is particularly true of what is said to be the heaviest capacity gantry crane in the world—a monster Whiting 350-ton piece of equipment at the Inland Power & Light Co. hydro-electric development on the Lewis River at Ariel, Wash. With a span of 98 ft. and a height of 99 ft., this crane has but one function; to handle the turbine genera-

tors installed at the power house. Perhaps twice a year is it called upon to operate; when it is so used there must be unfailing assurance of dependability.

Cranes installed in industrial plants could not earn their keep at that rate, of course. Cranes installed for emergency use, or for purposes of plant equipment maintenance, cannot properly be termed "materials handling equipment," and are not therefore subject to the same considerations that determine the economy of production apparatus. Just how busy a production crane should be depends entirely upon the type of shop it serves and the kind of jobs it is expected to handle. Sometimes there is just so much work for it to do, and no more. A crane *must* be there for certain jobs, and those



Factor in Heavy Crane Economy

jobs are few and far between. When that is the case there can be no criticism of the idle crane time; but when a crane is idle, and handling jobs within its range are accomplished by other means, then the planning is wrong somewhere.

The other side of this picture occurs even more frequently. A heavy crane used frequently to handle light loads is also uneconomical. Again the planning is at fault, but for an entirely different reason. The first case is one of improperly planned production; the second is one of lack of proper materials handling equipment, which the use of a second, lighter crane, or a monorail hoist, might overcome advantageously.

To strike an economic balance between use and idle time of a heavy crane, and between the use

of the heavy crane and of lighter equipment, is a management problem for each plant, going back of the equipment involved to the more fundamental question of a rational plan of materials movement. Without that rational plan no piece of materials handling equipment will yield its utmost possible economies.

With such a plan, however, the question as to the type of equipment to be used may be taken out of the realm of guesswork into the realm of scientific selection, where economics plays a major part. And here one further general point should be considered. As between one crane and another, differences in design and construction may cause operating and maintenance costs, as well as investment costs, to vary considerably. The weights of cranes per ton of capacity are

different for every crane manufacturer. And, while it does not necessarily follow that the lowest ratio of crane weight to lifting capacity means the most efficient service, there is no denying the fact that metal costs money, and that the lesser weight crane operates at lower power costs.

Against these factors in each case must be balanced ease of operation, flexibility of service, dependability, and costs of maintenance. Factors of such character being approximately equal, however, it is reasonable to say that of two cranes of equal capacity, one weighing considerably more than the other, the purchaser pays for too much metal in the heavier one, and likewise pays too much to run it. Simple as this consideration is, it is all too often

AT LEFT

A WELLMAN bulk cargo handling crane effecting rapid transfer of materials from boats to railroad cars or vice versa for the Western Maryland Railway Co.

AT RIGHT

SHEPARD - NILES gantry crane at freight yard handling l.c.l. freight by the container - shipment method. A filled container being transferred from car to truck.



overlooked as having a bearing upon both initial and upkeep costs, when selecting a crane.

Crane Elements

Travelling cranes are mechanical devices for the handling of heavy loads, *off the floor*. They take the heavy materials or parts handling problems up into the air, and thus conserve valuable floor or ground space. Frequently, for the heaviest loads, they provide the *only* means of mechanical handling.

Like Caesar's Gaul, all travelling cranes are divided into three parts. There is first a runway, or

as to permit the hook (or magnet or bucket, as the case may be) to serve the greatest possible square footage of the area bounded by the runways. Fundamentally, this means the utmost possible clearances in the trolley—to enable the hook to run close to either runway track as well as close to both ends of the runways, and to gain the greatest possible effective lifting height as compared with the top-most limits of the trolley itself.

Not only should the trolley be so designed as to give these minimum service clearances; it should contain a hoisting mechanism at once rapid, safe and efficient, and

selecting a crane, not only with regard to the ratio of strength to capacity, but also with regard to the protection of the load in the matter of brakes, to the equipment in the matter of limit-of-travel stops, and to the operator in the matter of covered gears and the electrical equipment.

Speed of operation is a factor depending upon the service expected on the crane. Normally, rapid hoisting speed and rapid travel speed of trolley on bridge and of bridge on runways, is desirable; although a crane designed for infrequent service may be operated more slowly.



ONE of four Shaw-Box 2-ton cranes completely built of aluminum alloys, as installed in an incinerator plant where orthodox cranes could not be used.

set of tracks upon which the bridge travels longitudinally; then there is a bridge, spanning the runway, to provide a means for the trolley to travel laterally, and finally there is a trolley containing the hoisting mechanism proper.

Light cranes may be operated from the floor; heavy cranes are always operated from a suspended operator's cab. This cab may be attached to, and move with, the trolley, or hang from the bridge independently of the trolley.

The trolley is the heart of any crane. As compared to the trolley, the problems of designing the runway and bridge are comparatively simple construction engineering jobs. In the trolley, however, all the skill and experience of the crane manufacturer finds ample room for play.

The effective travelling crane will be so designed and constructed

be so constructed as to make maintenance easy and not costly. All parts susceptible to wear and damage should be readily accessible.

The life of a crane depends upon its lubrication. It is extremely important, therefore, that the means provided for lubricating all moving parts be adequate, and that they be so arranged that systematic lubrication service is made simple and easy.

Bridge and runway construction should be rigid. Since the almost universal adoption of roller bearings in the bridge trucks, this is particularly important, as misalignment caused by the interplay of the shocks of starting and stopping under heavy load conditions, on non-rigid structures, will quickly ruin the bearing cases.

Safety is one of the most essential elements to be considered in

Two general types of heavy cranes are widely used; the travelling crane as described above, with a movable bridge running on fixed overhead runway tracks, and the gantry crane, with a fixed bridge mounted on uprights equipped with trucks running on ground rails. Three general methods of load handling are common to both types of crane; the hook, the electro magnet, and the bucket. The hook is used to pick up heavy objects direct or in a sling, or to lift containers by their handles, or to engage in special grapples which pick up the load; the electro magnet to pick up ferrous materials and scrap; the bucket to pick up loose bulk material.

Frequently the illustration of unusual conditions serves best to make certain points clear. The pictures reproduced herewith have been selected to show not so much the usual range of crane ser-



CLEVELAND Crane & Engineering 10-ton crane in strip metal storage room picks up and transfers several coils at a time by means of a U-shaped carrier.

o o o

vice as some of the unusual conditions which have been successfully overcome, thereby indicating the extent of the adaptability of cranes to a myriad of handling problems.

Shaw-Box Crane & Hoist Co. recently solved a special problem of crane service in a manner which departed completely from orthodox methods. In an incinerator building which had been constructed with no thought of utilizing cranes, it became necessary to install overhead cranes to facilitate handling the rubbish. It was not possible at

the time to rebuild the building, and the columns supporting the roof were too light to support standard overhead travelling cranes. It became necessary there-

o o o

SHEPARD-NILES transfer crane with cupola-charging monorail hoist matched up with spur tracks leading to and from the cupola, enables 8 men to do the work of 44.

fore to design cranes that would be extremely light in weight, and yet had the capacity to handle the material expeditiously.

Four cranes were built entirely out of aluminum alloys, even to the clam shell buckets. The total weight of each crane as installed is 13,700 lbs. Similar 2-ton capacity cranes built in orthodox fashion from steel would have weighed in excess of 21,700 lbs.

A Wellman masterpiece is a bulk cargo handling crane serving a
(CONCLUDED ON PAGE 90)



Skilled Labor Shortage Stimulates

SKILLED labor shortage, plus increasing wages, are having various effects in the metal-working industry. Among them is an increased

appreciation and demand for steel castings, in those spheres of application for which they are best suited. In this article, the author tells "why".

° ° °



THE modern steel foundry with an efficient organization is successfully producing cast-to-shape parts of all sizes and designs with varying degrees of intricacy, and for various uses. From this procedure the buyers of cast steel products obtain certain

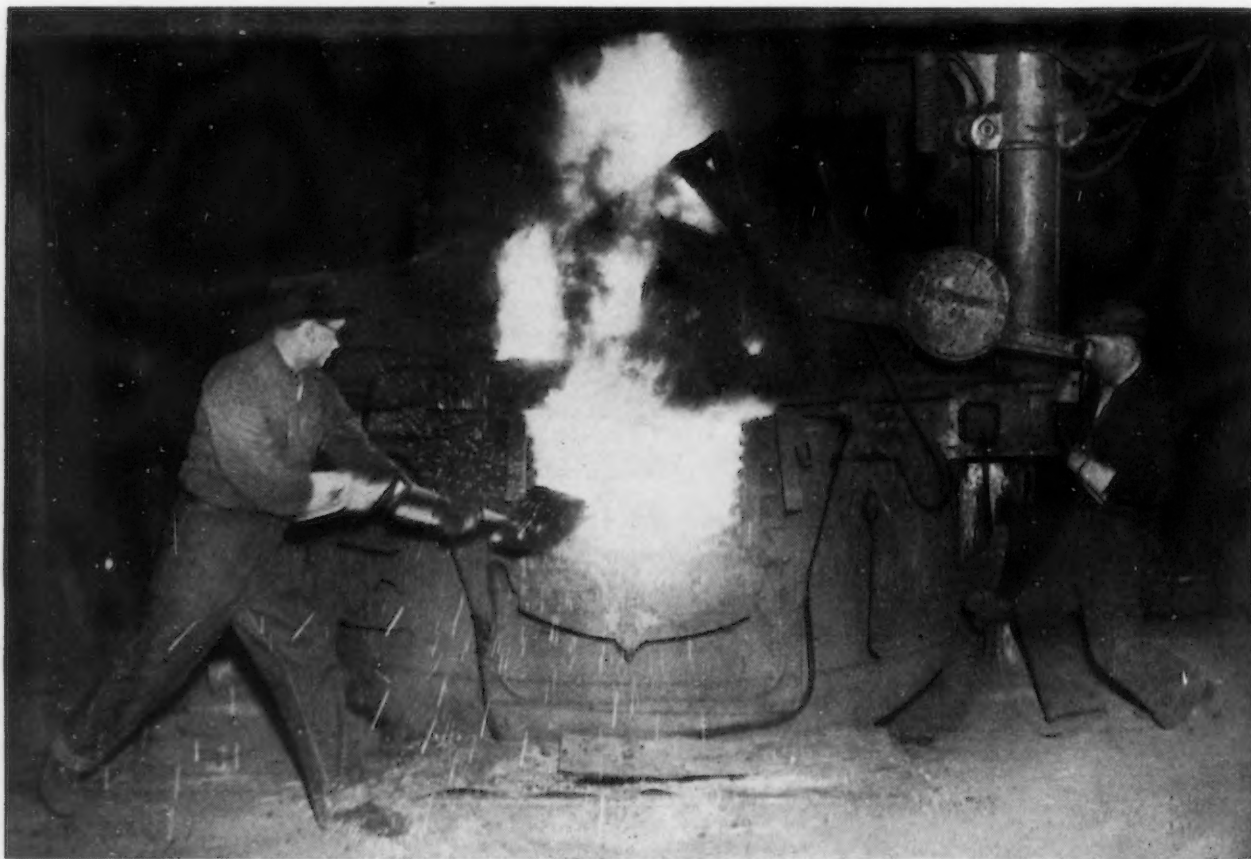
benefits and savings which can be obtained in no other manner. There is still great opportunity in

° ° °

MELTER on electric furnace making the ferroalloy additions to the molten steel just before tapping the furnace.

this field for the users of metal products.

As business improves and there is greater necessity for saving man-hours of work due to a probable shortage of skilled mechanics, the advantages of using steel castings to replace other materials may become more pronounced. Machine work can be reduced in many instances by the use of cored holes that would otherwise have to be drilled; by the use of machining pads and bosses on only those parts of the casting which need to be machined; by casting to shape parts ordinarily machined from solid blocks of steel; by combining into a single casting two or more



Steel Castings Demand

By W. J. CORBETT

Works Manager, Atlas Steel Casting Co.

parts previously machined and joined together; and by numerous other methods. There are many instances where a combination of welded steel parts and cast steel parts would result in considerable economy when assembling several such parts into a single structural unit. Cast steel parts have the advantage over other cast metals in that they may more readily be joined together or joined to other steel parts by welding.

Steel castings have in many instances taken the place of steel forgings to save the delays and cost of dies and machine work. Designers and users of metal parts usually determine whether the ul-

timate cost of forgings and stampings including the cost of dies and subsequent machining is less than that of steel castings. By doing so they can often create a saving by using parts cast in steel to the desired shapes.

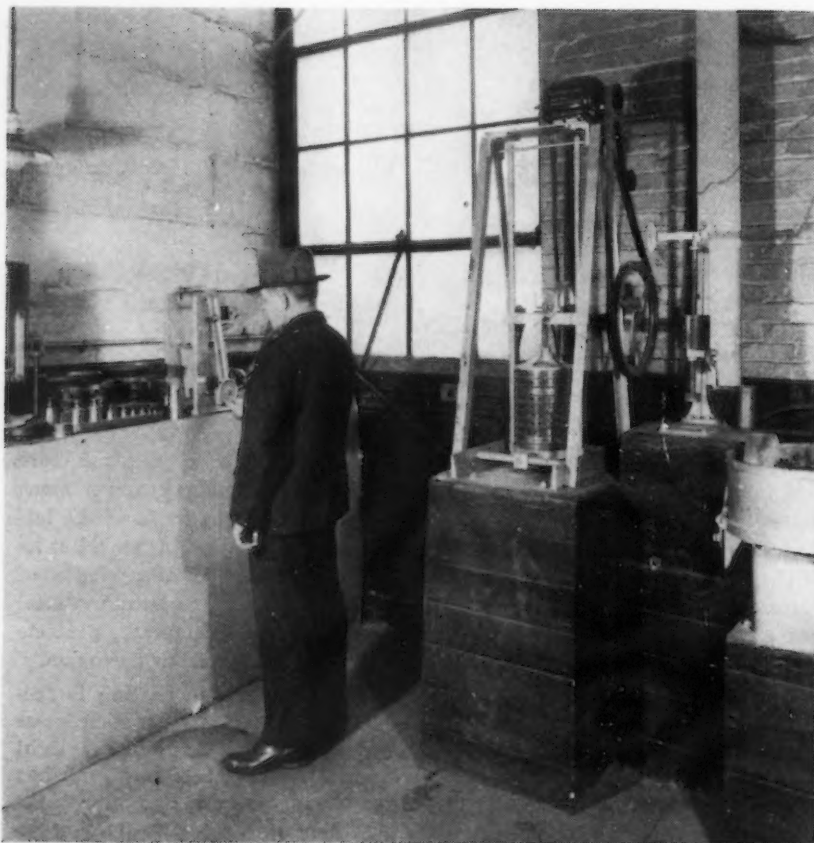
Another possibility for saving lies in the use of cast steel parts encased with rolled stainless steel where the parts are subject to corrosion by chemical action. Instead of making the entire casting of

stainless steel, which is much more costly than regular carbon steel, the casting can be made of the latter when the design permits its being covered with thin sheets of stainless steel. The stainless steel covering welded in place, protects the steel casting from corrosion.

The weight of a casting is frequently important. In such cases where strength as well as light weight are required, cast steel has special advantages. Heavy castings of other metals can frequently be changed in design to make them lighter when cast steel is used. Or if breakages of parts made of other metals occur, they are frequently replaced with cast steel, thereby

POURING steel into molds with a bottom-pour ladle.





CORNER of a sand testing laboratory showing small sand mill, screens for fineness testing, compression testing machine and permeability testing apparatus.

eliminating delays and expense incident to breakages in service.

A great variety of sizes and designs of steel castings are made in the steel foundries. There are virtually hundreds of thousands of different kinds of steel castings produced annually. Their range in weights is from only a few ounces to more than fifty tons. Their designs vary from the most intricate to the least complex shapes.

The thickness of the metal sections which can be cast in steel, as well as the variety of shapes, enables designers to take advantage of the steel foundry's ingenuity in producing castings to fit certain uses with consequent economy. Metal sections as thin as 3/16 in. are not uncommon in steel castings. The steel foundry's ability to produce thin section castings permits the use of steel castings to take the place of weaker metals in cases where light weight, strength, and toughness are needed.

Steel castings are advantageously used when consumers require special features neither economically nor readily obtainable if the

parts were made by other methods or of other materials. For example, if parts are to be case-hardened, a special low-carbon steel is used for the castings; or if they must have special physical properties, the various alloy steels and special heat treatments are used.

The steel foundry is in a position to furnish numerous kinds of steel to suit the users' requirements, making various types of carbon steels from 0.15 per cent to 0.80 per cent carbon, as well as many different kinds of alloy steels. The steels having 0.15 per cent to 0.25 per cent carbon are used for parts to be case-hardened, for some electrical machinery parts, and for castings which are to be made of what is commonly called "soft" steel. The 0.25 per cent to 0.35 per cent carbon steels are used for castings which are considered "medium" or "mild" steel in commercial specifications. The higher carbon steels are used for castings in which hardness and greater strength are required. The various alloy steels, to which no trade names have been applied on account of possible confusion in the

minds of buyers, are used in castings which are for different purposes and which must have physical properties differing from those obtainable with the carbon steels.

This ability of a steel foundry to furnish various kinds of steel to suit the user's requirements, is decidedly advantageous. It presents an opportunity for expanding the use of steel castings and effecting economies in manufacturing industries, especially in those which have not thoroughly investigated the possibilities in using steel castings.

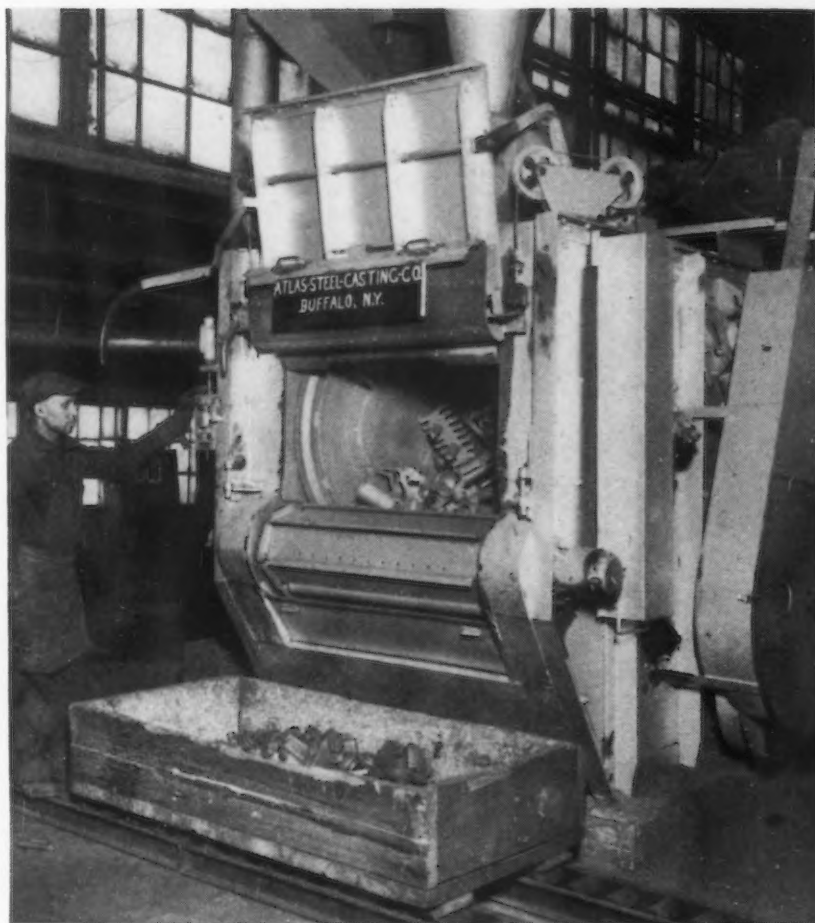
Interest is commonly displayed by users of castings in the kind of melting furnaces employed in making steel for castings. Electric furnaces, open hearth furnaces, converters, and crucibles are used for this purpose. The first two furnaces are those most commonly used in steel foundries. The electric furnace is generally used for making steel for castings weighing from a few ounces to several thousand pounds and castings of relatively thin sections, while the open hearth furnace is necessarily used for larger castings than could be poured from an electric furnace, as well as for smaller castings weighing a few hundred pounds.

Skilled operators of steel-making furnaces are employed in the steel foundries. It is not simply a question of striving to obtain the maximum amount of steel from a furnace in 24 hours. The quality of the steel is the primary factor, as the steel foundry's principal reason for existence is the making of satisfactory castings in accordance with its customers' requirements. To do this, the quality of the steel made in the melting furnaces is carefully controlled, along with the various other operations in the foundry which are just as important as steel-making.

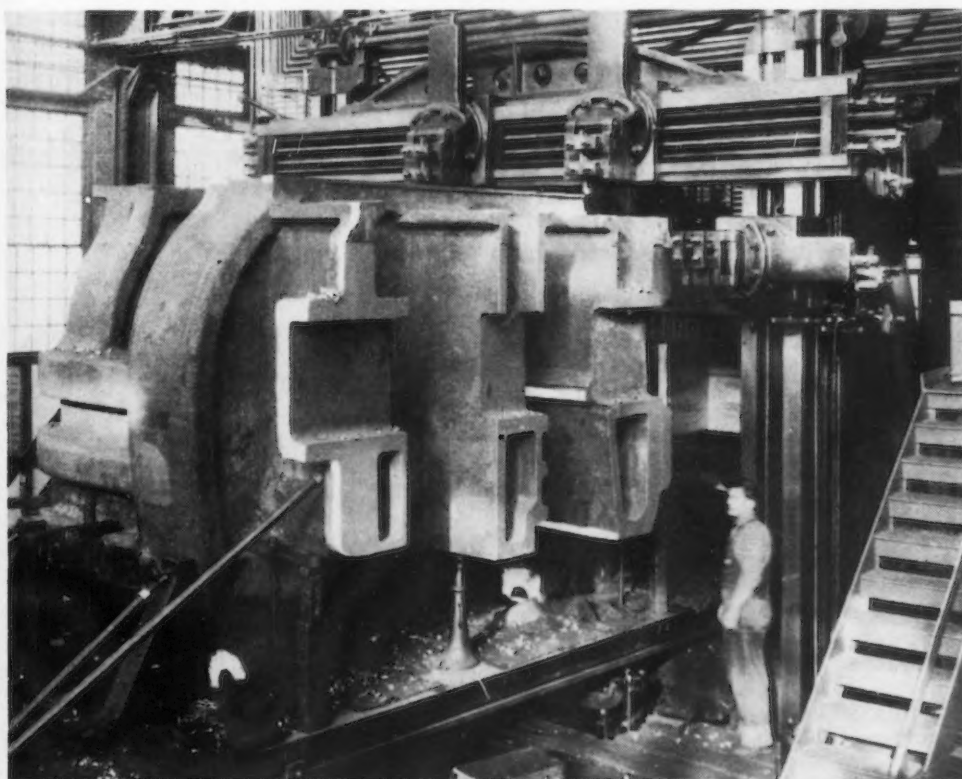
The physical properties of the steel in a casting do not have marked differences in different directions of a section. There is no work done on a steel casting to alter the uniformity of its internal crystalline structure, which tends to cause it to have different physical properties longitudinally than transversely. The modern steel foundry maintains a physical testing laboratory, and the testing of the physical properties of the steel in the castings is a regular procedure, especially the tension test which is the most common one.

By the proper selection of the kind of steel to be used in castings for certain purposes, and also designation of its correct heat treatment, desired physical properties are obtained. The physical properties such as strength, ductility, hardness, etc., cover a wide range and are dependent upon the chemical analysis of the steel and its heat treatment. Consultation with the steel foundry at the time designs are being made for metal parts is frequently advisable and beneficial. This procedure will result in specifying the correct analysis of steel when the part being designed is to be used in extraordinary service where the regular, medium, or low carbon steel is not the most suitable.

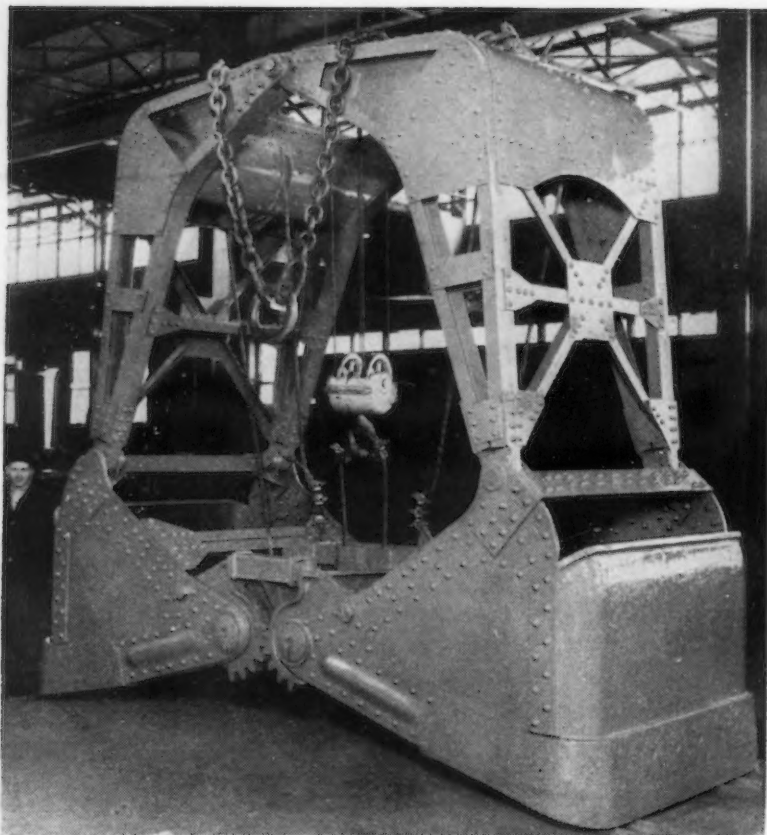
Designers and users of metal parts who are not familiar with the possibilities of steel castings should derive considerable benefit from visits to the steel foundries. They will see what others have done along the lines of designing parts to be cast to shape in steel. They will also become acquainted with the various methods used in modern steel foundries to manufacture castings to meet consumers' needs and eliminate extra work in the machine shop and on the assembly floor.



CLEANING of small steel castings, in this installation of a Tumblast machine, is done by an impeller revolving at high speed, which throws the abrasive.



THIS 89-ton steel casting was recently machined at the Milwaukee plant of Allis-Chalmers Mfg. Co. It measures 11 ft. high by 12 ft. wide and it will be used as the front half of a bed plate for a 7½-in. forging machine. The work was performed on a 14-ft. planer.



New Type of Clam Shell Bucket

A NEW type of four-yard, hook on, two-line clam shell bucket, specially designed to meet the unusual crane conditions existing at most skull cracker pits of steel plants, has been perfected by the Blaw-Knox Co. of Pittsburgh and has been in successful operation at the Pittsburgh works of the Jones & Laughlin Steel Corp.

Since all single line rope-reeved type buckets necessarily require certain automatic mechanisms, the new two-line bucket designed for hook on operation eliminates many complexities and provides for greater versatility.

Owing to the fact that ladles and magnets as well as clam shell buckets must be handled at open hearth cinder pits, the usual installation is a traveling crane with two hooks arranged in a plane at right angles to the tracks carrying the cars. This arrangement of hooks makes the use of the regular type two-line clam shell buckets impossible, since the buckets would have their jaws working in the wrong position for dumping broken slag into cars. As a result of this situation, most plants use single line hook on buckets, which have obvious disadvantages since they must handle broken slag ranging

from fines up to large pieces extending to the full capacity of the jaws. In handling large skulls which do not permit complete closing of the bucket, the load cannot be dropped because of possible damage from sudden closing.

The new type bucket is picked up by both the main and auxiliary crane hooks. The one hook picks up a chain sling which is attached to the bucket head and the other hook picks up the operating line. With the two cable drums spaced at three or four feet, there is no fouling of the lines, and the bucket jaws are in the proper position in relation to the cars. The bucket is provided with an open top 5 ft. sq., so that the hook operating the dumping mechanism can have a short purchase on the cable reeved directly to the bucket. This makes it possible to operate the bucket with a head room of 24 ft., which would be impossible if the hook operating the bucket were attached above the bucket as is the practice in most two-line clam shells.

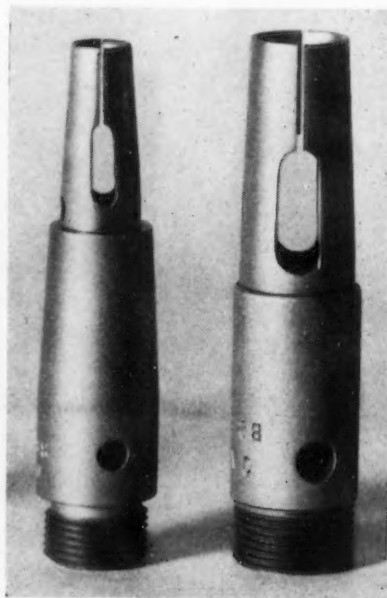
The bucket is of extremely sturdy construction, weighing 22,000 lb. The jaws and trays are made of chrome-nickel-molybdenum steel, heat treated so that it is able to retain its properties in the pres-

ence of hot slag. This steel has a tensile strength of 100,000 lb. and has a Brinell hardness at the cutting edges of 350. The scoop side plates are made of alloy steel of a tensile strength of 80,000 to 90,000 lb. Hinge and corner castings are made of nickel-vanadium steel with the main hinge pins of chrome-nickel heat treated steel SAE 3140. Sealed anti-friction bearings are provided for all sheaves, and high tensile bronze bearings of 250 Brinell hardness are used for the hinges.

In spite of the fact that speed ratios on the two lines normally provided on the cranes often show wide variation, it has been found that even a difference in the ratio of five to one in the speed does not interfere with successful operation.

Feed Fingers For Screw Machines

A LINE of feed fingers for feeding stock in automatic screw machines has been developed by the Eastern Machine Screw Corp., New Haven, Conn. A feature of these H&G type K fingers is that the same finger can be used on many different makes and sizes of machines. They are proportioned for the size of stock they are to feed rather than for the size of machine. Adapters are provided to fit the different sizes and makes of feed tubes and give the proper overall length for each machine. Uniform gripping pressure, lower finger cost and simplified feed finger inventory are advantages claimed.



Feed fingers and adapters, the new H & G type K.

Plug-In Instruments For Industrial Use

A NEW plug-in instrument, the self-supporting socket of which can be mounted directly in the wiring conduit, with a claimed saving of 35 per cent over a conventional installation, has been developed by the Westinghouse Electric & Mfg. Co., East Pittsburgh. In the illustration, W. M. Bradshaw, Westinghouse manager of meter engineering, is shown discussing the new device with H. P. Sparkes, sales manager, at left. Plants powered by individual drive such as machine and textile, will benefit particularly, it is stated, since the development makes practical the low cost use of instruments to act as guide for "production speed vs. machine life." The present universal socket will give any desired load conditions merely by plugging in an ammeter, voltmeter, watthour meter, etc., one after another in the same socket. Standard "troughs" (all-metal boxes) with several sockets, can be



used when more than one instrument is to be read at the same time, and can be mounted much like a motor starter. Quick and convenient mounting has been worked out for ordinary wiring, such as rigid conduit, open wiring or cable.

as could be produced with a special purpose blanking die.

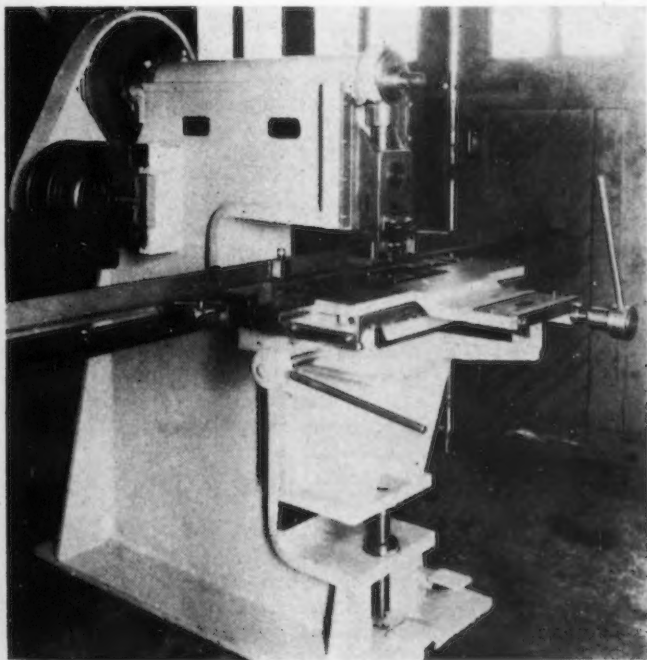
As the nibbling attachments can be removed from the press as quickly as a regular set of dies, the machine is readily available for all classes of punch and die work. A larger diameter flywheel is available for presses requiring somewhat lower speed and greater stored energy. Eccentrics may also be replaced readily for one of another throw where changes of stroke are desirable. Clutches are provided with safety, non-repeat feature for operating standard dies. By the turn of a button this can be disengaged and the treadle latched down for work with the nibbling attachment.

Deep-Throat Presses of Welded Construction

A LIGHTER weight series of deep-throat adjustable bed power presses, having all steel welded frames and welded steel adjustable knee beds, has been placed on the market by the Service Machine Co., Elizabeth, N. J.

When used in conjunction with the nibbling attachment illustrated,

a small light-weight flywheel is furnished; this, together with the high-speed clutch and ring oil bearings permits operating speeds up to 175 strokes per min. It is stated that with this high speed it is possible to clamp a piece of formed molding or trim on the nibbler table and cut an opening for hardware or similar fixtures almost as fast



DEEP-throat press with weld fabricated steel frame and adjustable knee bed. A small flywheel is furnished for use in connection with the nibbling attachment; this with the high-speed clutch and ring oil bearings permits operating speeds up to 175 strokes per min.

New Johansson Gage Block Set

INTRODUCTION of a new No. 2 set of precision gage blocks at a price somewhat less than that of the present No. 2 sets is announced by the Johansson division of the Ford Motor Co., Dearborn, Mich. It is offered in addition to the present No. 2 set, and is the same as the latter except for four accessory items—two jaws and two adjustable holders. Blocks are of "B", "A" and "AA" qualities, accurate to within plus or minus 8, 4 and 2 millionths of an inch.

The 35 gage blocks comprising the new set provide 80,000 different size measurements in steps of 0.0001 in.

In keeping with the announcement of a gage block set at a lower price, the Johansson Division has also substantially reduced prices on all "A" quality metric blocks.

THIS WEEK ON THE ASSEMBLY LINE



... Automobile industry produces 139,090 cars in one week, comparing with 1929 peak of 160,000 cars.

o o o

... Despite handicap of five-day week, all manufacturers are putting on determined drive for higher output.

o o o

... General Motors forms diesel engine division and will build new plant; Detroit steel mills expanding facilities.

DETROIT, April 26—Rounding the corner of its spring selling season, the automobile industry is pressing on the accelerator in a determined drive to climb the 1929 production curve, possibly to reach a new peak. Despite the handicap of operating only five days a week, manufacturers put out 139,090 units in the past week, comparing favorably with the 1929 maximum output of 160,000 units, according to Ward's Automotive Reports. While this kind of pace is straining every facility of the auto plants and suppliers, there is evidence that next week's figures may be higher yet. A 150,000-car week is just ahead.

Buick indicates the frame of mind that prevails in Detroit. Back

in the early fall, before sit-downs took such a slice from the output, that concern and others foresaw a 5,500,000 to 6,000,000-car year and set its schedule at about 240,000. Today, despite the setback of labor troubles, Buick sticks to that plan and other builders who have set up for record-breaking production are pressing ahead. Ford, another good example, has been adding various pieces of equipment at the Rouge plant in the past month, and this is expected to be reflected in higher production in the near future. Ford now is building 7000 a day, although it is probable that part of the pressure on Rouge assembly lines has been applied in anticipation of labor trouble. Others also have increased the daily pace to

compensate for strike shut-downs. Pontiac, for instance, is increasing its rate steadily, 6900 to 7000 cars a week being the aim.

Sales Are Increasing

However, sales figures continue to jump upward faster than production. In the week of April 8-15, passenger car deliveries in the Detroit area (Wayne County) doubled those of the previous week. R. L. Polk & Co. reported 3340 deliveries, compared with 1590 the previous week and 2749 a year ago. All over the country, sales moved far ahead of predicted heights during March and April. Polk today revised its estimate of March registrations upward from 395,000 to 425,000, an increase of 30,000.

Coincident with the improvement in the auto situation, the city's factory employment level shot upward within 10 points of the highest reached in 1929. The Detroit Board of Commerce reports that recovery after the strikes has been much more rapid than most optimistic observers had predicted. The employment index came up from a strike low of 87.3 to 127.4 and the board's industrial department predicts that an all-time high for employment may be set within the month.

General Motors Forms Diesel Engine Division

Final confirmation of earlier reports about the General Motors truck diesel engines is at hand. A 75-acre tract of land on the Pere Marquette Railroad at Outer Drive,



on the west side of Detroit, will be the site of the plant, where the new diesels will be manufactured. A new division, to be known as the diesel engine division, has been organized. The smallest unit to be built will be a single cylinder, 20-hp. stationary type. Others will range in size up to a six-cylinder 160-hp. engine and will be adaptable for marine, stationary and commercial vehicle use. The first new building, to be started at once, is to be the engineering laboratory. As previously reported the manufacture of Winton fuel injectors will be moved from the research laboratories as soon as possible. A diesel-electric power plant in the new laboratory building will supply power to the manufacturing plant, the first unit of which will be commenced in May. Heating requirements will be supplied through an electrically heated boiler absorbing current from the test dynamometers.

Mill Expansion

In the down river district near the Rouge, the Detroit Steel Corp. has just put into operation a new four-high united reversing mill, duplicating present equipment. It also has added a two-high Bliss skin pass mill and a new motor room. The changes increase the mill's capacity by about 4000 tons of cold rolled a month, bringing the total to 10,000 tons. A new office building is in the process of construction. Expansion of two other cold-rolled mills in Detroit is about to take place, and one hot roll-mill

is about to add cold rolling equipment in its shop. In addition, there is one group which anticipates enough continued demand here to warrant formation of a new steel company mill. Backers of the venture hope to get under way soon, but refuse to make names or plans public yet. Another proposal that may blossom forth before long is to build some more furnaces, using a site near Marysville, which has excellent lake and river water transportation. Digging has begun at the Great Lakes Steel Co. plant for four new open hearths. A new blooming mill soon will be in operation there.

There is a steadily growing volume of business in the structural steel line and there is a heavy demand for other structural items such as pipe.

A Difference in Chrysler and G.M. Labor Agreements

Chrysler's final settlement with the UAW contains some terms about which more will be heard the next time the UAW and one of the auto companies start negotiations. In part 1, section 9, of the agreement, supplementary to the pact which ended the strike, there is a provision under which the company must pay the district committeemen of the union for time spent in investigating grievances.

The text reads: "District committeemen may perform their duties of conferring with foremen or other designated representatives of the plant management, or with the labor relations supervisor of the

plant during working hours without loss of time or pay. A district committeeman shall always notify his foreman before leaving his work."

At General Motors the union has no such pleasant and profitable arrangement for its grievance committee. Instead, each member must punch out his card at the time clock before he begins to function for the union. The UAW then pays a dollar an hour to the committeeman. With the hundred and one complaints that have arisen in General Motors plants, it has been pretty expensive, frequently costing the union several hundred dollars a week in each plant. Now the expense falls on Chrysler, and it is to be noted that each shop district has one representative, with assistants for second and third shifts. According to other terms of the agreement, there will be about 120 districts set up, the same as existed under the works council by the proportional representation plan established in 1934 by the old Automobile Labor Board. In the new setup, there will be a plant committee of six men to handle the major questions, but they will not be paid by the company.

Split in UAW Command

Those close to the UAW in Detroit have anticipated since early February the split that now is apparent in the union's high command. So far John L. Lewis has refrained from giving the friendly nod, in public, either to Homer Martin or Wyndham Mortimer.



BULLARD

PROVED PROFIT-BUILDERS

Every job illustrated here was more Profitably machined on the Bullard Mult-Au-Matics than by the Best previous method.

New jobs and redesigned old jobs are continually coming up for tooling and improved methods of manufacture. In each instance, the use of Bullard Mult-Au-Matics affords an opportunity for cost reductions.

Long experience over a Wide field of Service enables Bullard Engineers via the Mult-Au-Matic Method to assist in solving many of your cost reduction problems.

Let us make estimates on your Problem Jobs.

MULT-AU-MATICS

THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

However, sides have been chosen pretty definitely for the days that lie ahead. First tremors were noticed when Martin, the president of the international union, was given his tickets to go on a speaking tour during the General Motors conferences. Mortimer, first vice-president, remained here to carry on negotiations at Lewis' side. In those days it was said that Martin was too willing to give in to Sloan's men while Lewis, in a hotel bed with the flu, insisted on showing more fight. In the event that the battle is carried to the August convention, where it seems likely that Mortimer will attempt to succeed Martin, Lewis probably will throw his support as head of the CIO to Mortimer.

Of the well-known names on the roster, Martin only has that of Richard T. Frankensteen, Detroit area organizer, as a backer. Mortimer has Ed Hall, second vice-president, George F. Addes, secretary-treasurer, and the three Reuther brothers. Despite this disparity, Martin has not yet lost any important fight before his board of directors, but he is fortunate in having a majority there, where general officers are without votes; otherwise the story might be different.

The color of the discussion between these union heads is red. Communism and extremisms have been subjected to some verbal attacks from Martin, and those lined up with Mortimer are said to be members of former adherents of the Communist Party. Some of this group were ousted from the Mechanics Educational Society of America a year or so ago. Now Martin, opposed to the radical element that has been snatching at his reins, is on the verge of what his supporters say will be a "red purge." He won his first real test a week ago at Flint, when he brought about invalidation of a primary election which, he told members there, should not be held until the executive board has prepared a formula for the governing of local unions. In a meeting closed to reporters there was a bitter fight before 3000 members. His opponents charge that Martin feared an election because the results would have placed in power Robert Travis, Flint general organizer, and others who have been linked with Mortimer.

Short Sit-Down at Flint

The other day at Flint there was a short sit-down in the Buick plant that aptly illustrates some of the uncertainty that still exists in the shops. After parleys with the stewards, Buick management

agreed to pay on a weekly basis, instead of bi-weekly, and set the day as Friday instead of Thursday. Although the proposal for the changes had been made by stewards, they apparently had not prepared the way with their members, for what happened was a sit-down on the stewards. Then the stewards, paid of course by the union, had to take time off to correct the misunderstanding that was delaying production.

At the Oshawa plant, General Motors work resumes now under terms similar to those which General Motors signed at Detroit for American plants. Local autonomy prevailed, however, to the extent that the 50-hr. Canadian week was cut to 44 hrs. Hourly pay rates of 55c. or less are to be raised 7c. Those now over 55c. are to go up a nickel. The agreement, which does not specifically recognize the UAW but does so in fact, is the foundation for CIO plans to organize 40,000 Ontario auto workers.

The tone is softer, spirit more friendly between the UAW and some Toledo industrialists. David R. Wilson, Willys-Overland Motor Co. president, played host at a dinner for UAW representatives after signature formalities incident to the signing of Willys' first formal contract with the union. A year of friendly relations and a verbal agreement which both sides respected preceded the written treaty, in which Mr. Wilson voluntarily inserted a clause providing for the transfer of aged workers to easier tasks. Again in this contract the right of representation is granted to the union only to the extent of its membership.

Autotown Sidelights—With 100 Ford busses of the new metropolitan type still to be delivered on an order, Detroit's Street Railway is drawing specifications now for 250 more coaches for fall delivery. There are approximately 1000 now in service and two storage units are planned to house the added rolling stock. * * * The whole industry watches as Packard's 15,000 workers go to the polls in the first voting of auto men under the Wagner Labor Act. It is the first time that the UAW has been willing to test its strength this way, having passed up the chance in the Chrysler case. Actually, many Packard executives sincerely believed that the Union could never show any strength in their plant. * * * In depression days, Briggs Mfg. Co. Highland Park plant was the scene of one of the city's most bitterly fought strike battles. Now, after 32 days of peaceful negotiation, Briggs and the UAW have signed together. * * * Electric arc welding

of Ford's two new Lake vessels will add 300-ton cargo capacity to each, according to the James F. Lincoln Arc Welding Society. * * * Three vessels which had been tied up at Buffalo docks since 1929 by the Great Lakes Steamship Co. have passed Detroit up bound, having been pressed into service to assist in the ore movements from northern Michigan. * * * Strikers on Lake Michigan car ferries are expected to be back at work shortly. Because they failed to wait 30 days before calling a strike, as required by the Railway Labor Act, their strike has been called illegal, but there seems to be no cure nor recompense for the delay and loss that have been caused. * * * Graham-Paige accessory sales are running more than 400 per cent ahead of the figure for this time last year.

Pittsburgh Rolls Modernizes Furnaces

THE Pittsburgh Rolls Corp., a Blaw-Knox Co. subsidiary, is modernizing and expanding its equipment. Three air melting furnaces, formerly hand fired with coal, or oil fired, are being equipped with a modern pulverized coal burning system. In conjunction with the pulverized coal machinery, there is to be installed a complete coal handling system, permitting the unloading of coal from hopper cars, conveyance to elevators, and then to the pulverizers. Power demands will be increased greatly, and a 22-kv. loop station is being erected.

Additional equipment also will include two new roll grinders of their own design, and a 1300 cu.ft. air compressor. Added to an original six, these new roll grinders will give the mill a range from 20 to 60 in.

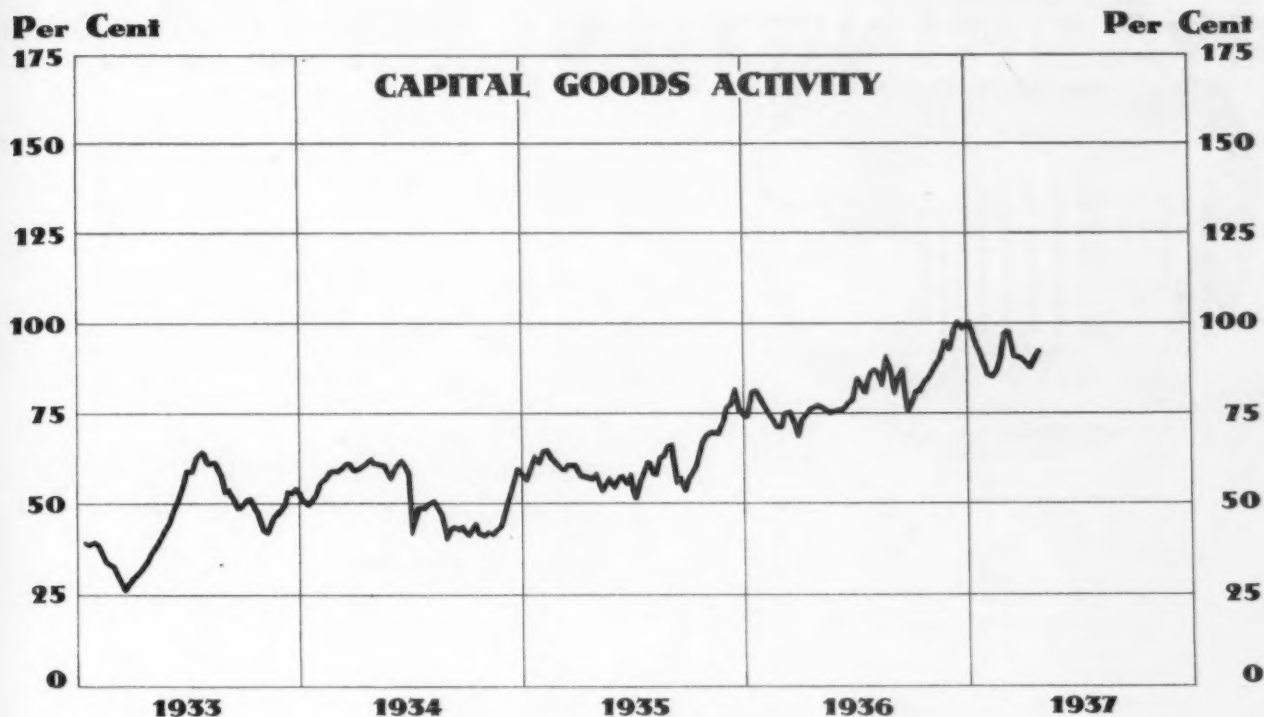
Chain-Link fence is now being woven with a fabric of Konik steel, according to announcement by the Continental Steel Corp., Kokomo, Ind. Konik steel is made with small amounts of copper, nickel, and chromium in patented proportions. Practically all of the physical properties are said to be improved—tensile strength and yield point, elongation and reduction. The material is also said to have greater resistance to rust and corrosion than standard steels, or even copper-bearing steel. It is not a stainless steel, yet the nickel and chromium add to the rust-inhibiting effect of copper.

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	March, 1937	February, 1937	March, 1936	Three Months, 1936	Three Months, 1937
Raw Materials:					
Lake ore consumption (gross tons) ^a	5,142,496	4,443,306	2,897,867	8,481,741	14,280,114
Coke production (net tons) ^b.....	.....	4,283,681	3,366,665	10,110,549	.....
Pig Iron:					
Pig Iron output—monthly (gross tons) ^c	3,459,473	2,999,218	2,040,311	5,889,902	9,670,191
Pig iron output—daily (gross tons) ^c	111,596	107,115	65,816	64,724	107,447
Castings:					
Malleable castings—production (net tons) ^d....	.....	57,295	45,536	134,345	.....
Malleable castings—orders (net tons) ^d.....	.....	60,187	48,008	130,138	.....
Steel castings—production (net tons) ^d.....	.....	92,678	51,674	143,926	.....
Steel castings—orders (net tons) ^d.....	.....	95,693	71,341	182,061	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e	5,229,431	4,424,659	3,342,619	9,352,983	14,390,787
Steel ingot production—daily (gross tons) ^e ...	1,180,458	1,106,165	754,542	719,460	1,119,035
Steel ingot production—per cent of capacity ^e	90.13	84.46	57.61	54.93	85.44
Finished steel:					
Trackwork shipments (net tons) ^e	10,720	8,153	6,258	13,740	26,119
Sheet steel sales (net tons) ^f.....	.....	.....	251,818	564,867	.....
Sheet steel production (net tons) ^f.....	.....	.....	207,820	622,179	.....
Fabricated shape orders (net tons) ^g	182,049	88,946	108,826	370,133	401,646
Fabricated shape shipments (net tons) ^g	131,691	91,848	107,687	265,885	315,559
Fabricated plate orders (net tons) ^d.....	.....	30,340	30,437	97,009	.....
U. S. Steel Corp. shipments (tons) ^h	1,414,399	1,133,724	783,552	2,181,281	3,698,041
Ohio River steel shipments (net tons) ⁱ	122,100	88,170	116,510	196,052	306,670
Fabricated Products:					
Automobile production, U. S. and Canada ^k	*518,715	383,637	438,992	1,117,172	1,301,681
Construction contracts, 37 Eastern States ^l	\$231,245,900	\$188,257,300	\$198,761,900	\$553,973,800	\$662,347,200
Steel barrel shipments (number) ^d.....	.....	.....	660,551	1,720,572	.....
Steel furniture shipments (dollars) ^d.....	.....	\$2,071,847	\$1,585,800	\$4,656,391	.....
Steel boiler orders (sq. ft.) ^d.....	.....	871,746	589,676	2,023,427	.....
Locomotive orders (number) ^m	29	33	13	73	108
Freight car orders (number) ^m	6,200	10,532	627	8,913	27,613
Machine tool index ⁿ	211.6	165.2	105.3	†109.4	†192.4
Foundry equipment index ^o	294.2	249.5	115.0	†117.4	†244.8
Foreign Trade:					
Total iron and steel imports (gross tons) ^p....	.....	41,628	56,720	150,567	.....
Imports of pig iron (gross tons) ^p.....	.....	11,340	23,743	53,436	.....
Imports of all rolled steel (gross tons) ^p.....	.....	23,134	22,046	63,212	.....
Total iron and steel exports (gross tons) ^p....	.....	290,987	264,337	719,703	.....
Exports of all rolled steel (gross tons) ^p.....	.....	115,335	92,606	237,719	.....
Exports of finished steel (gross tons) ^p.....	.....	104,007	86,676	223,318	.....
Exports of scrap (gross tons) ^p.....	.....	143,197	163,295	459,366	.....
British Production:					
British pig iron production (gross tons) ^r	680,300	603,700	633,600	1,813,800	1,934,700
British steel ingot production (gross tons) ^r	1,109,500	995,900	980,100	2,831,100	3,104,300
Non-Ferrous Metals:					
Lead production (net tons) ^a.....	.....	37,451	35,150	105,573	.....
Lead shipments (net tons) ^a.....	.....	50,375	36,743	104,419	.....
Zinc production (net tons) ^t	53,202	37,794	42,411	120,209	131,043
Zinc shipments (net tons) ^t	59,635	46,953	38,087	124,274	157,815
Deliveries of tin (gross tons) ^v	9,080	7,675	5,520	17,755	24,370

† Three months' average. * Preliminary.
Source of figures: ^a Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^e American Iron and Steel Institute; ^f National Association of Flat-Rolled Steel Manufacturers; ^g American Institute of Steel Construction; ^h United States Steel Corp.; ⁱ United States Engineer, Pittsburgh; ^j When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of Census; ^k F. W. Dodge Corp.; ^l Railway Age; ^m National Machine Tool Builders Association; ⁿ Foundry Equipment Manufacturers Association; ^o Department of Commerce; ^p British Iron and Steel Federation; ^q American Bureau of Metal Statistics; ^r American Zinc Institute, Inc.; ^s New York Commodities Exchange.



THE IRON AGE Weekly Index Numbers of Capital Goods Activity
(1925-27 Average = 100)

Last week	92.1	Same week 1933	35.4
Preceding week	89.8	Same week 1932	37.4
Same week last month	90.3	Same week 1931	71.3
Same week 1936	77.0	Same week 1930	102.5
Same week 1935	57.0	Same week 1929	127.9
Same week 1934	63.1		

REFLECTING a further sharp increase in automobile output and more than seasonal gains in steel production, lumber shipments and industrial operations at Pittsburgh, THE IRON AGE's weekly index of capital goods activity advanced last week to 92.1 per cent of the 1925-27 average from 89.8 in the week preceding, a rise of 2.3 points. The only series to register a decline for the period was the index of heavy construction activity.

In automobile assemblies, capacity operations at most plants last week boosted output to 139,090 units, against 127,755 units in the preceding week, a record unequaled since 1929. Steel mill operations rose to 92 per cent of the country's capacity, or above the best average weekly production for any month in the peak 1929 year. Elsewhere the gains were less impressive, but the advance in the general

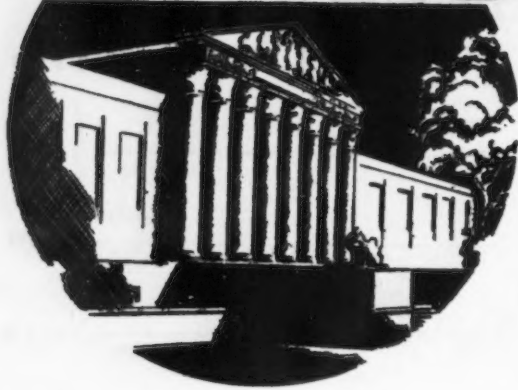
activity index reflected considerable strength in the aggregate.

The level of 92.1 per cent of average or "normal" contrasts with a figure of 77.0 for the corresponding week in 1936 and 57.0 for the same 1935 week. In the same period back in 1933 the index stood at 35.4. Actual operations reported for each of the index's five industrial series last week are given below.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	92	+1
Automobile production (number of cars and trucks)	139,090	+11,335
Railroad loadings of forest products (number of cars)	36,532	+579
Pittsburgh industrial production and shipments (index number)	105.8	+1.8
Construction contracts awarded (total value)	\$44,308,000	-\$2,619,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

WASHINGTON



... Granting of special freight rates on iron ore indicates new movements this year.

. . .

... European scrap cartel to divide imports; some plants abroad using purchased scrap for first time.

. . .

... Bill passed by Congress provides \$3,500,000 for purchase of "strategic and critical materials."

By L. W. MOFFETT
Resident Washington Editor,
The Iron Age

. . .

WASHINGTON, April 27.—Demand for steel-making raw materials is reflected interestingly in reductions being made in iron ore freight rates, as well as in new movements of ore shipments authorized by the Interstate Commerce Commission. Pressing for early effectuation of the new rates, railroads are making applications to the I.C.C. under the so-called sixth section provision of the Interstate Commerce Act, which permits new rates to become operative upon five days' notice after they are filed.

New iron ore rates per gross ton, just authorized and in or about to go into effect, include the following:

Buffalo to Boston — Everett, Mass., \$2.

Mt. Hope and Richards, N. J., to Monessen, Pa., \$2.52.

Erie, Pa., and Buffalo to Baltimore, \$1.94 f.o.b. barge.

Other like applications to cut rail rates on iron ore are about to be made, it is reported.

The Buffalo-Boston-Everett rate, effective May 3, applies to intermediate points, such as Worcester, Mass., and represents a sharp slash from the present sixth class paper rate of 30c. per 100 lb., or \$6 per ton to Boston and Everett and 29c. per 100 lb. to Worcester. It, therefore, means a new movement from Lake Superior mines. The rate was asked for by the rail carriers, West Shore, D. L. & W., Erie and Lehigh Valley, to meet a water rate of \$1.86, exclusive of insurance. At Everett is the blast furnace of the Mystic Iron Works.

The Mt. Hope-Richards-Monessen movement is so unusual that there is at present no iron ore rate provided for it. It was asked for in order to ship 5000 tons of ore to the Monessen furnaces of the Pittsburgh Steel Co. The tariffs provide for two routings. The participating carriers are the Mt. Hope

Mineral, Central of New Jersey, New York Central, Delaware, Lackawanna & Western, Western Maryland, Pittsburgh & Lake Erie, and Pittsburgh & West Virginia.

. . .

Rate to Sparrows Point

The Erie-Buffalo-Baltimore rate was applied for by the Pennsylvania, Baltimore & Ohio, and Lehigh Valley to serve Lake Superior ore to the Sparrows Point, Md., plant of the Bethlehem Steel Co. The ore will be loaded on Bethlehem's own barges at Baltimore for transshipment to its Sparrows Point furnaces. There is at present a rate of \$1.94, exclusive of dumping charge, from Erie and Buffalo for track delivery at Baltimore.

Some of the applications point out that the reduced rates are necessary because import supplies, shut off by world demand, no longer are available. The rates also are established to develop new sources of domestic supplies for the furnaces concerned.

The curtailment of imports, how-



VALLEY MOULD AND IRON CORPORATION
GENERAL OFFICE **HUBBARD, OHIO**

ever, is only one reason for drawing more heavily on domestic ore sources. Another is the movement to increase pig iron output, enforced by high scrap prices.

European countries at the same time have organized a scrap cartel to allocate imports of scrap, principally from the United States, one prime purpose being to conserve their own coke and ore supplies.

The applications of the railroads to grant reduced iron ore rates are

viewed as being wholesome, particularly in meeting the existing market situation whereby furnaces must turn to new movements or stimulate existing movements to get supplies at a reasonable cost. Manifestly, this will hold down production costs and therefore steel prices, which the administration has attacked as being too high. And that the industry wants to keep prices in hand is evident from its re-affirmation of present prices on principal products for the third

quarter, led by the Carnegie-Illinois Steel Corp. The railroads, however, appear to have placed themselves in an inconsistent position in seeking to lower particular rates on iron ore at a time when they have before the Interstate Commerce Commission in the general rate case an application to increase ore rates. Interior furnaces under the applications are being asked to pay dual increases, that is, on the rail movement from mines to upper Lake ports and on the rail movement from lower Lake ports to furnaces.

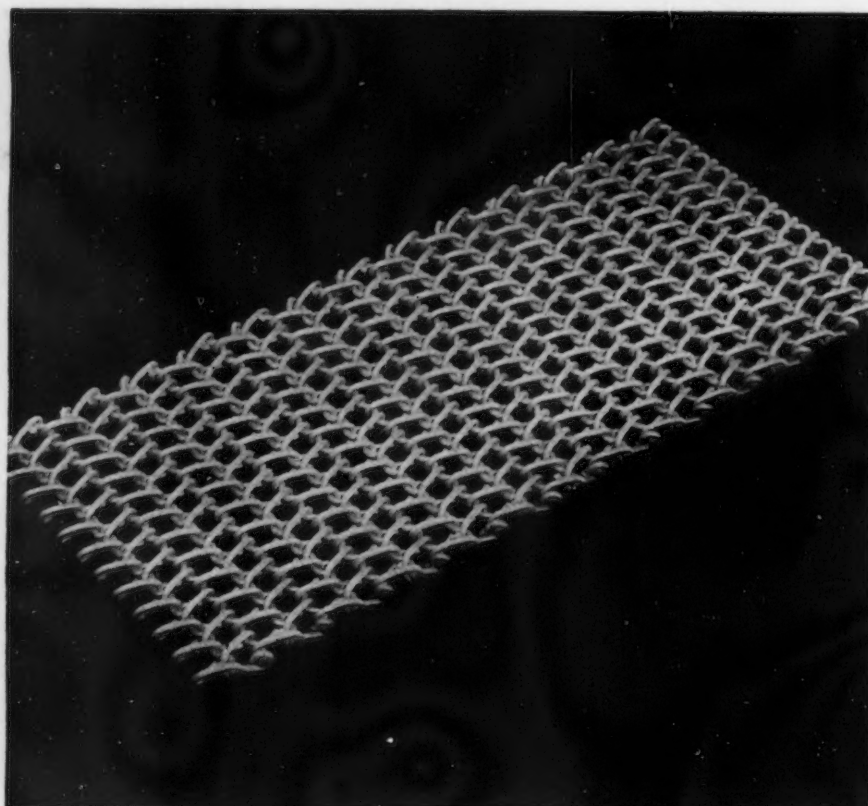
Scrap Problems in Europe

European countries, like the United States, have their scrap problems. Unlike the United States they have organized a scrap cartel. France, holding out against joining up with a system of quotas, sticks to an export tax to hold down shipments of old material. This, too, is unlike the United States. Even the most determined non-conformist will admit that an export tax is unconstitutional. American scrap dealers could organize an export association affecting shipments abroad. This could be done under the Webb-Pomerene Act. Quite different from the European cartel system.

The plan for forming a scrap cartel among principal European importers is described in a recent report received from Consul Hugh S. Fullerton, Paris, who said a meeting had been held in Paris for that purpose.

"Quota participation in imports by the various countries party to the comptoir would be based upon imports during the period 1934-36 and maximum prices to be paid would be fixed periodically," the report said. "The British participants, as representing the largest European consumers of scrap iron, would be in charge of the comptoir. French consumers, although invited to participate, have not done so, feeling that the present situation of their market did not warrant such a step, absorbing as it does all available supplies of scrap.

"European metallurgical interests find that the use of scrap instead of iron ore reduces coke consumption by 50 per cent. Numerous plants in France which have never consumed scrap are now buying it to supplement iron ore," it was stated. "A recent decree of the French Government has placed an export tax of 30 francs per 100 kilograms upon scrap exports from French territory abroad. In recent years, French scrap iron consumption has averaged 2,500,000 metric



MORE TYPES than a DOG has FLEAS



Send for
this 16-page
Bulletin No. 40-13

Use of our various patented and patent pending weaves not obtainable elsewhere, in addition to all standard weaves, permits us to engineer a Metalwove Continuous Processing Belt to exactly meet your requirements . . . Maximum service life is obtained, even at temperatures up to 2000° F. by the use of Nickel-Chrome Heat Resisting Alloys, while for other conditions Stainless Steel, Aluminum, Manganese Steel, Bronze, Copper and other ductile metals are used . . . Write us describing your problems, or if desired, one of our engineers will call.

AUDUBON FLEXIBLE WIRE CLOTH

AUDUBON WIRE CLOTH CORP., Butler & Allen Sts., PHILADELPHIA
Subsidiary of Manganese Steel Forge Co.

tons annually, from 500,000 to 600,000 tons being exported.

Bill Appropriates \$3,500,000 for "Strategic Materials"

As finally passed by Congress last week, the Naval Appropriations bill provides \$3,500,000 for the procurement of "strategic and critical" materials. The provision emerged in this sensible form after a hot fight in the course of which the Senate tore up root and branch an amendment offered by Representative Scrugham appropriating \$5,000,000 to purchase and conserve strategic minerals from "domestic supplies," a phrase omitted from the bill as enacted. Neither the deleted Scrugham amendment nor the one adopted, specifies the "materials," the word substituted because of its broader meaning for "minerals." But the materials in mind include manganese ore, tin, tungsten, mercury, and nickel as Mr. Scrugham has stated. It was not possible for opponents to understand how these materials could be drawn from "domestic supplies," as his amendment required, when there are no domestic supplies of some of them, particularly tin, and only low-grade supplies of manganese ore. There was the thought that the Scrugham amendment was too directly related to moves to have the Government purchase, prepare and store domestic manganese ore. The amendment that found its way into the bill was offered by Representative Umstead of North Carolina. It reads as follows:

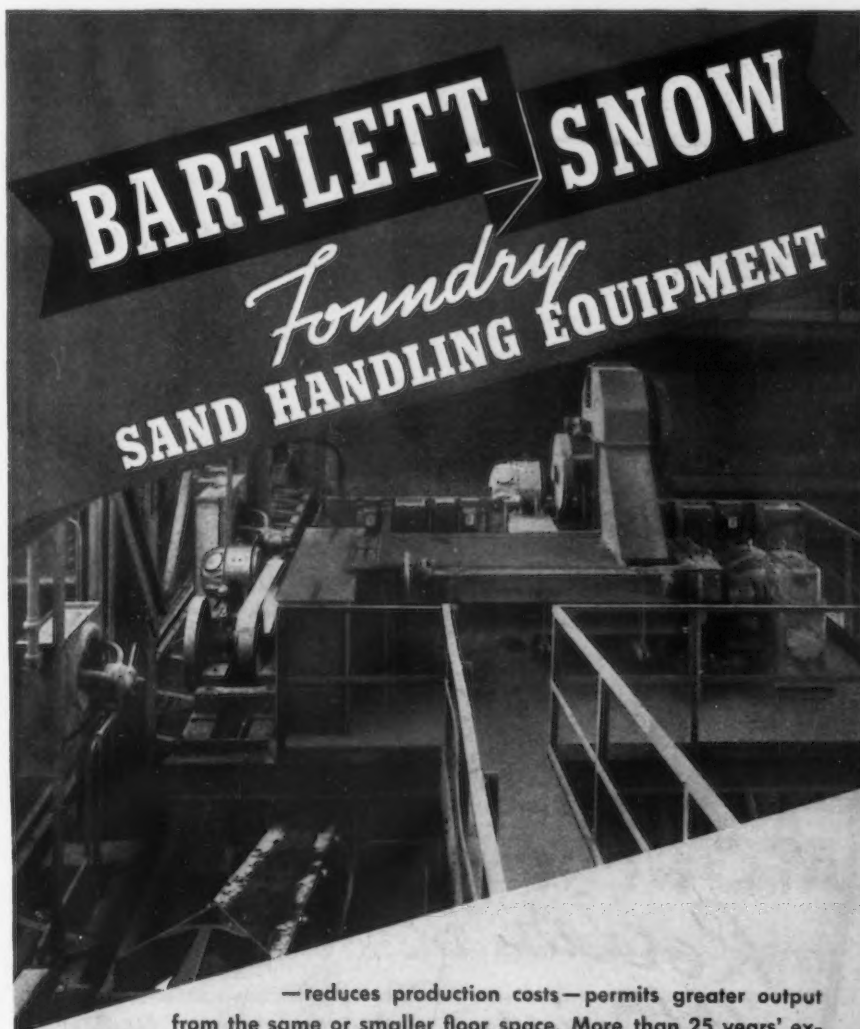
"For the procurement and transportation of strategic materials, \$3,500,000 to remain available until expended; provided, that materials acquired hereunder shall not be issued for current use in time of peace without the approval of the Secretary of the Navy, except that materials . . . may be issued for current use when replaced by materials purchased from current appropriations; provided, further, that . . . the Secretary of the Navy shall determine what materials are strategic and critical."

Miss Perkins' Labor Conference

Peace-on-earth-good-will to labor and industry appears to represent one of the desirable purposes of Madam Secretary of Labor Perkins at conferences on collective bargaining. The first one, held last Tuesday, reflected this commendable atmosphere. Whether or not the objective sought is attained, it obviously is all to the good, insofar as it goes. However, criticism has been made that mere wishing for and discussing the obvious is hardly constructive. And it is doubted that Miss Perkins can enlighten

either labor or industry on the technique of collective bargaining, or the "established law of the land," as she has said in commenting on recent Supreme Court decisions. Rather the opinion prevails that she would do better to leave to industry and labor the settlement of their problems through collective bargaining. At the same time, if she insists on getting into the picture, much to the displeasure of the National Labor Relations Board, she might offer a constructive contribution

by getting down to brass tacks, and standing up against the sit-down strike. And advise the CIO to do likewise, if Mr. Lewis proposes to make good his promise to enter upon collective bargaining in good faith. But Mr. Lewis left the conference without getting such advice. No doubt he would stage a walk-out if the advice were offered. His rival, William Green of the A. F. of L., also present at the conference, who is on record against the sit-down, would have enjoyed the spectacle, no doubt.



THE C.O. BARTLETT-SNOW CO.

6202 HARVARD AVENUE CLEVELAND, OHIO
NEW YORK • CHICAGO • BOSTON • PHILADELPHIA • BALTIMORE • PITTSBURGH

DUST COLLECTORS • CONVEYING AND ELEVATING EQUIPMENT OF ALL KINDS • ROTARY DRYERS AND COOLERS
BOILER PLANT COAL AND FOUNDRY SAND HANDLING EQUIPMENT • CHAINS, SPROCKETS AND BEARINGS
STEEL DRUM PAINTING, PAINT DRYING AND DRUM RECONDITIONING EQUIPMENT

Answer Filed in Cast Iron Pipe Case

WASHINGTON, April 23.—The Federal Trade Commission has received the first reply to its complaint in the Birmingham-plus system case, in which charges were directed against the Cast Iron Soil Pipe Association and 36 other respondents, including members of the Association. The complaint was brought under both the Federal Trade Commission and the Robinson-Patman acts and charges substantially lessened price competition and price discrimination among buyers through use of the Birmingham-plus system.

The initial answer has been filed

by the Drapery Hardware Co., Los Angeles, which makes a general denial of the allegation and says it is no longer a member of the association and is not engaged in the production of cast iron soil pipe. The company states that it now only sells the remainder of pipe fittings on hand from previous production. The answer admitted that the company has received price lists from the Cast Iron Soil Pipe Association, but denies the association has governed its sale price or that its sale prices have been the prices based upon association lists. Also denying jurisdiction under the commission, the company says that sales of its cast iron soil pipes have been made entirely within the State of California.



..PERSONALS..

WILLIAM THOMAS CROWE has been appointed general manager of the new diesel engine division of General Motors Corp. He is a graduate of the University of Detroit, having obtained the degree of mechanical engineer in 1916. Mr. Crowe joined the engineering staff of the Hudson Motor Car Co. shortly after graduation and remained in Detroit until 1918. When



W. T. CROWE

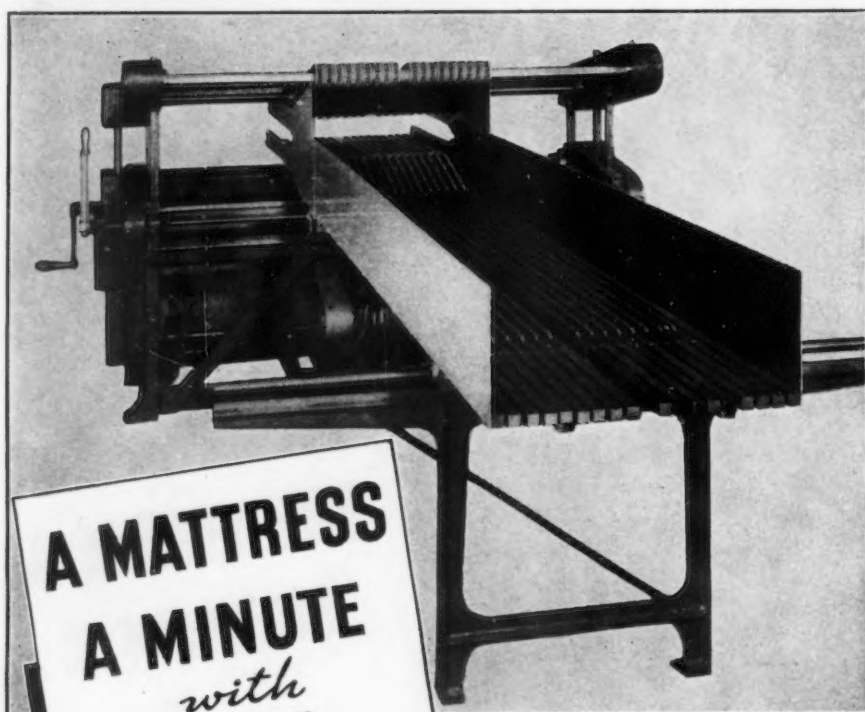


Photo courtesy of Droll Patents Corp.

**A MATTRESS
A MINUTE**
with
**Roller
Chain**

More than 480 mattresses, any size, any quality—filled in an eight hour shift. That's production! And it's done every day with machines like the one illustrated here.

Baldwin-Duckworth roller chain is an integral factor in the whole operation. 93 individual chain

drives are used on each of these Droll Filling Machines. This is a further example of the adaptability of Baldwin-Duckworth roller chain to any elevating, conveying or power transmission problem requiring durable, economical operation.

Write for catalog. Baldwin-Duckworth Chain Corporation, Springfield, Mass.



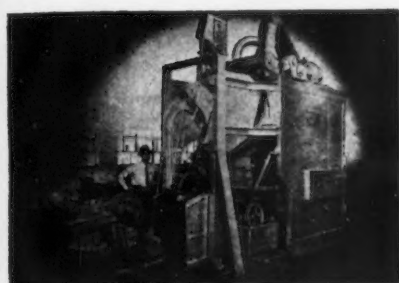
the United States entered the World War, he was sent to McCook Field in Dayton by appointment of the Hudson company at the request of the Government. He was later given an overseas assignment where he studied French methods of aviation engineering. Upon his return to this country, he resumed his position with the Hudson company. In 1920 he joined General Motors as chief engineer of the engine division of General Motors of Canada, Walkerville, Ont. He was transferred to the export division of the company in Detroit in 1925, where he served as manager of the Detroit office for a little over a year. He was then sent to Germany to study automobile manufacturing conditions in that country and figured to a large extent in the redesign and manufacture of the Opel car after Adam Opel of Germany was purchased by General Motors. He has been on the staff of O. E. Hunt, vice-president of General Motors in charge of engineering, since 1929.



WALTER S. AYLSWORTH, formerly Western Pennsylvania district

SEE PANGBORN'S ALL STAR CAST OF BRILLIANT PERFORMERS AT THE 41st FOUNDRY SHOW IN MILWAUKEE • MAY 3-4-5-6-7

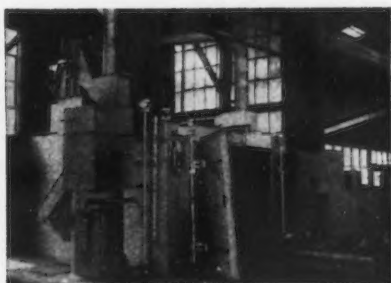
AIRLESS ROTOBLAST



- AIRLESS
- BARRELS
- TABLES
- CABINETS
- SPECIAL MACHINES

Pangborn Airless ROTOBlast equipment, judged by actual performance records, is changing the foundry picture in scores of plants. Its few moving parts, its easy adaptation for handling most types of work, its outstanding production speed, its finer finish, its low operating costs, its compactness, all combine to make the ROTOBlast the foundry sensation of the modern industrial world.

STANDARD AIR BLAST



- COMPRESSED AIR
- ROOMS
- TABLES
- CABINETS
- BARRELS

More foundries have had more years of continued satisfactory service and profit from PANGBORN Blast Cleaning equipment than from any other. The name Pangborn on any product you buy is assurance of "more dollar value for your money." If you are in doubt as to the most economical equipment to use for your cleaning problems, we'll gladly give you our viewpoints, based on our thirty-three years of successful experience.

DUST COLLECTORS



- ALL METAL FRAME,
- CLOTH SCREENS,
- DUST COLLECTORS

A size and type for every
Dust Control requirement

Pangborn Dust Collectors are known and specified by industry all over the world. From the smallest size to those serving the largest plants in the country, a PANGBORN DUST COLLECTOR means continuous satisfaction, elimination of worry and reliable protection from all DUST hazards. It is said that all Dust problems end with PANGBORN. Let us prove this in your plant.

BULLETINS AVAILABLE DESCRIBING EQUIPMENT AND SUPPLIES FOR EVERY BLAST REQUIREMENT

PANGBORN

WORLD'S LARGEST MANUFACTURERS OF BLAST CLEANING AND DUST COLLECTING EQUIPMENT
PANGBORN CORPORATION • • HAGERSTOWN, MD.

representative for Charles Taylor Sons Co., is now representing the Mullite Refractories Co. in the Pittsburgh district.

♦ ♦ ♦

FRED C. KINDLER has been appointed manager of steel casting sales by Mackintosh-Hemphill Co., Pittsburgh. He has resigned from a similar position with the Otis Steel Co., Cleveland, with whom he was connected for about 26 years in the steel foundry department in various capacities.

NATHANIEL B. RANDOLPH, vice-president in charge of sales of the Granite City Steel Co., Granite City, Ill., has been elected a director of the company to succeed the late Richard H. Higgons.

♦ ♦ ♦

GEORGE F. WALKER, who has been connected with sales development at the H. H. Robertson Co., Pittsburgh, for approximately 20 years, has joined the sales staff of the Mackintosh-Hemphill Co. and will be interested chiefly in the fur-

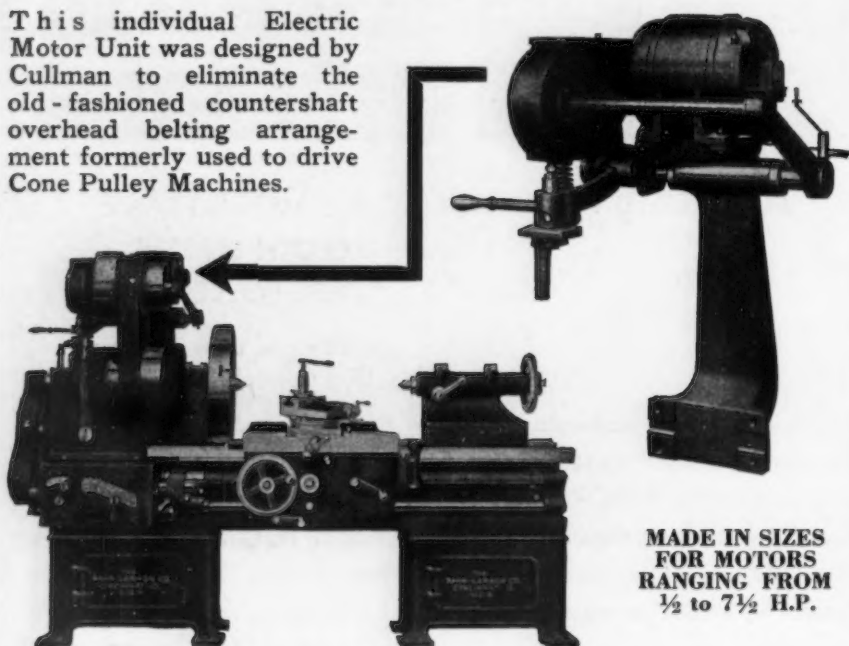
therance of its steel casting division.

♦ ♦ ♦

T. F. PATTON, resident counsel of Republic Steel Corp. for the past year, has been appointed general counsel of the corporation. A. J. GENTHOLTS, a member of the corporation's legal department for the past seven years and assistant resident counsel since last April, was named assistant counsel. Mr. Pat-

THE CULLMAN . . . LATHE DRIVE

This individual Electric Motor Unit was designed by Cullman to eliminate the old-fashioned countershaft overhead belting arrangement formerly used to drive Cone Pulley Machines.



MADE IN SIZES
FOR MOTORS
RANGING FROM
½ to 7½ H.P.

The Cullman Lathe Drive will increase the efficiency of your shop. Original cost is low, and it is long wearing. Operation is easy and safe, and control is instantaneous. Any lathe, shaper, milling, or screw machine now being driven by overhead belting can be modernized by the installation of a Cullman Drive.

ADVANTAGES

- Easily Installed
- Instant Control
- Increased Efficiency
- Smooth Operation
- Long Wearing

60 DAYS' FREE TRIAL

Write for particulars TODAY

Cullman Wheel Co.
1343 Altgeld St. Chicago, Ill.



T. F. PATTON



A. J. GENTHOLTS

ton, a graduate of the College of Law of Ohio State University, class of 1926, was a partner in the firm of Belden, Young & Veach, Cleveland, whose senior partner, the late William P. Belden, was general counsel for Republic Steel Corp. until his death. Mr. Gentholt, who was graduated from Cleveland Law School and was admitted to practice in 1917, served the Bourne-Fuller Co. as counsel from 1919 to 1930, when Republic acquired that company.

♦ ♦ ♦

STANLEY T. SCOFIELD, who has been engaged since 1932 in sales

research for the United States Steel Corp., New York, developing and coordinating market information underlying general commercial activities, organization objectives and plant investment considerations, has been appointed assistant to the vice-president in charge of sales. He was graduated from Ohio State University in 1905, when he became identified with a Midwestern manufacturer of mining and contractors equipment. There he developed an advertising and sales promotion department and later became sales manager of all distributor products. From 1918 to 1923 he conducted an advertising agency specializing in industrial and financial accounts. He was later identified with the Penton Publishing Co. in a market research capacity.

EVERETT L. MORGAN, assistant secretary-treasurer since 1928 of the Pratt & Whitney division, Niles-Bement-Pond Co., Hartford,



GEORGE O. WITH, manager of sales of the specialty division and concrete bar division of the Carnegie-Illinois Steel Corp. in the Chicago district, whose appointment was announced in these columns in the issue of April 15.

has been elected treasurer to succeed CHARLES K. SEYMOUR, who has retired. RICHARD W. BANFIELD, heretofore research engineer, has been elected agency sales manager, succeeding the late W. H. Miller.

S. M. D. CLAPPER, formerly president of the General Refractories Co., Philadelphia, has been elected chairman of the board, and FLOYD L. GREENE, formerly executive vice-president, has been made president.

LEON C. HULSE, who has been identified with the air conditioning division of the Gar Wood Industries, Inc., Detroit, has been named factory sales engineer of the air conditioning division.

H. E. FIELD has resigned as vice-president of the Continental Roll & Steel Foundry Co., East Chicago, Ind., and C. W. HELLSTROM has resigned as chief engineer. WALTER L. BERGHOFER has been appointed manager of casting sales. CLARENCE W. HOWAT has been appointed

district sales manager, and W. R. DUDA, chief engineer, with headquarters in the Grant Building, Pittsburgh.

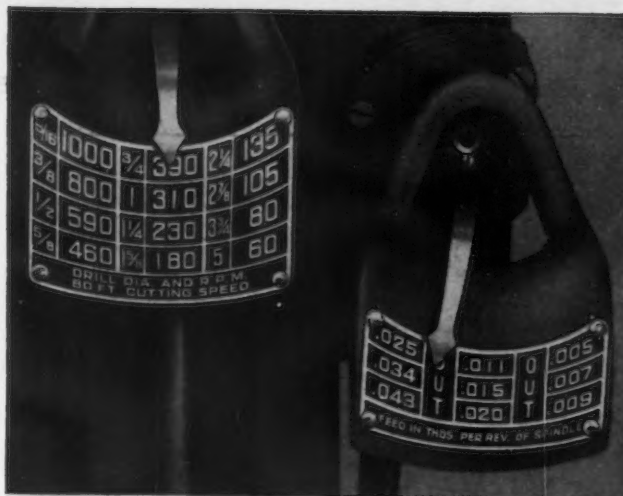
MYRON C. TAYLOR, chairman of the board, United States Steel Corp., has sailed for Italy on a two months' vacation.

ROBERT J. LINNEY has been appointed general manager of the Chateaugay Ore & Iron Co., Lyon Mountain, N. Y.

(CONTINUED ON PAGE 91)

All geared 21" 24" and 28" SUPER SERVICE UPRIGHTS

featuring
DIRECT
READING
SPEED
and
FEED
PLATES



● A wide range of useful speeds and feeds are instantly available on Super Service Upright Drills with convenient single lever control.

The speed plate at the left shows at a glance the 12 spindle speeds provided progressively from 60 to 1000 r.p.m. on the 24" and 28" machines. On the 21" machine, 9 speeds are available.

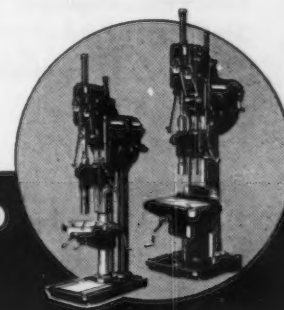
● At the right is shown the feed plate which on the 24" and 28" machines provides 9 rates of feed from .005" to .043" per revolution. On the 21" machine 4 rates of feed are provided.

By providing quick easy selection of feed, closely graded in range,

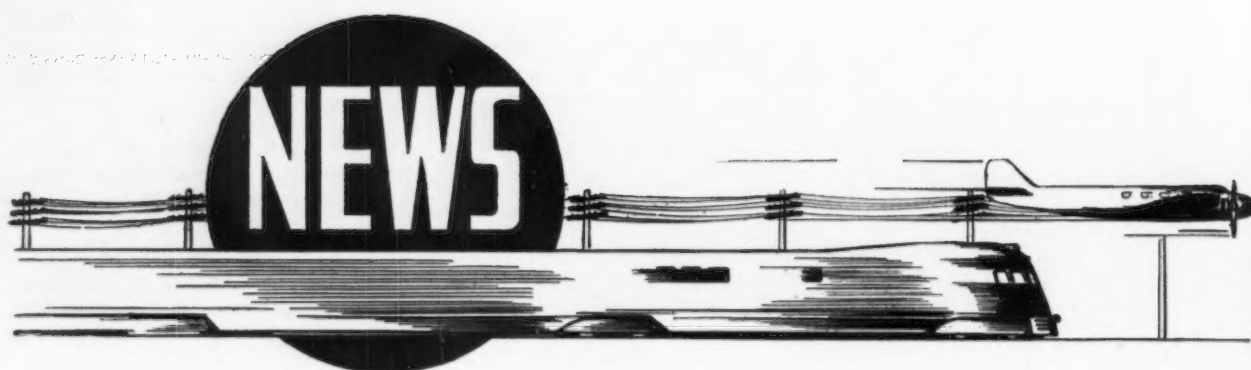
fine feeds are available for small drills, coarse feeds for large drills and fast feeds for reaming. Every tool used can be operated to the economical limit of its endurance.

Other features that make for long life and efficiency include: ball and roller bearings, heat treated alloy steel gearing, positive type feed clutch, automatic depth gauge and table arm controls at front of machine.

Write for Bulletin U-22.



**THE CINCINNATI BICKFORD
TOOL COMPANY**
OAKLEY - CINCINNATI - OHIO - U.S.A.



Second Machine Tool Electrification Forum Held at East Pittsburgh

SIX formal sessions at which more than 20 papers were presented and actively discussed featured the second machine tool electrification forum held under the auspices of the Westinghouse Electric & Mfg. Co. at East Pittsburgh, April 19-22. Inspection trips to the company's research laboratories, the control manufacturing division, and to the Westinghouse Nuttall works supplemented the sessions. Of the 84 visitors registered, 52 were representatives of some 40 machine tool building companies. Of the latter, makers of lathes, including turret and automatic, and of grinding machines, predominated in number.

The meeting, which opened with an address of welcome by Bernard Lester, assistant industrial sales manager, was comprehensive and included a number of papers by engineers in the machine tool industry. It was also noteworthy for the excellence of the arrangements.

The first formal session, devoted

to motors, featured the following papers: "Development of the Fan-Cooled Motor," by J. L. Brown, motor engineering department; "Electrical Braking of A-C Motors," by W. I. Bendz, Westinghouse district engineer, Boston; and "Motors for Special Applications," by R. S. Elberty, machinery electrification. Also, a group of papers on dynamic balance, one on "Theory," by J. G. Baker, research engineering; another on "Practice," by M. S. Hancock, manager, motor engineering; and a third on "Practice in the Machine Tool Industry," by F. L. Chapman, Gisholt Machine Co.

A control session, on the morning of April 20, comprized four papers. They were: "N.E.M.A. Control Standards," by G. H. Garcelon, manager, control engineering; "New Heavy-Duty Push-Buttons," by R. T. Kintzing, control engineer; "Electronic Control—Its Relation to Machine Tools," by E. H. Vedder, electronic sales engineer; and "Special Control for

Machine Tools," by R. S. Elberty. This session was followed by inspection of the control manufacturing departments and by a visit to the company's research laboratories.

Papers by Machine Tool Engineers

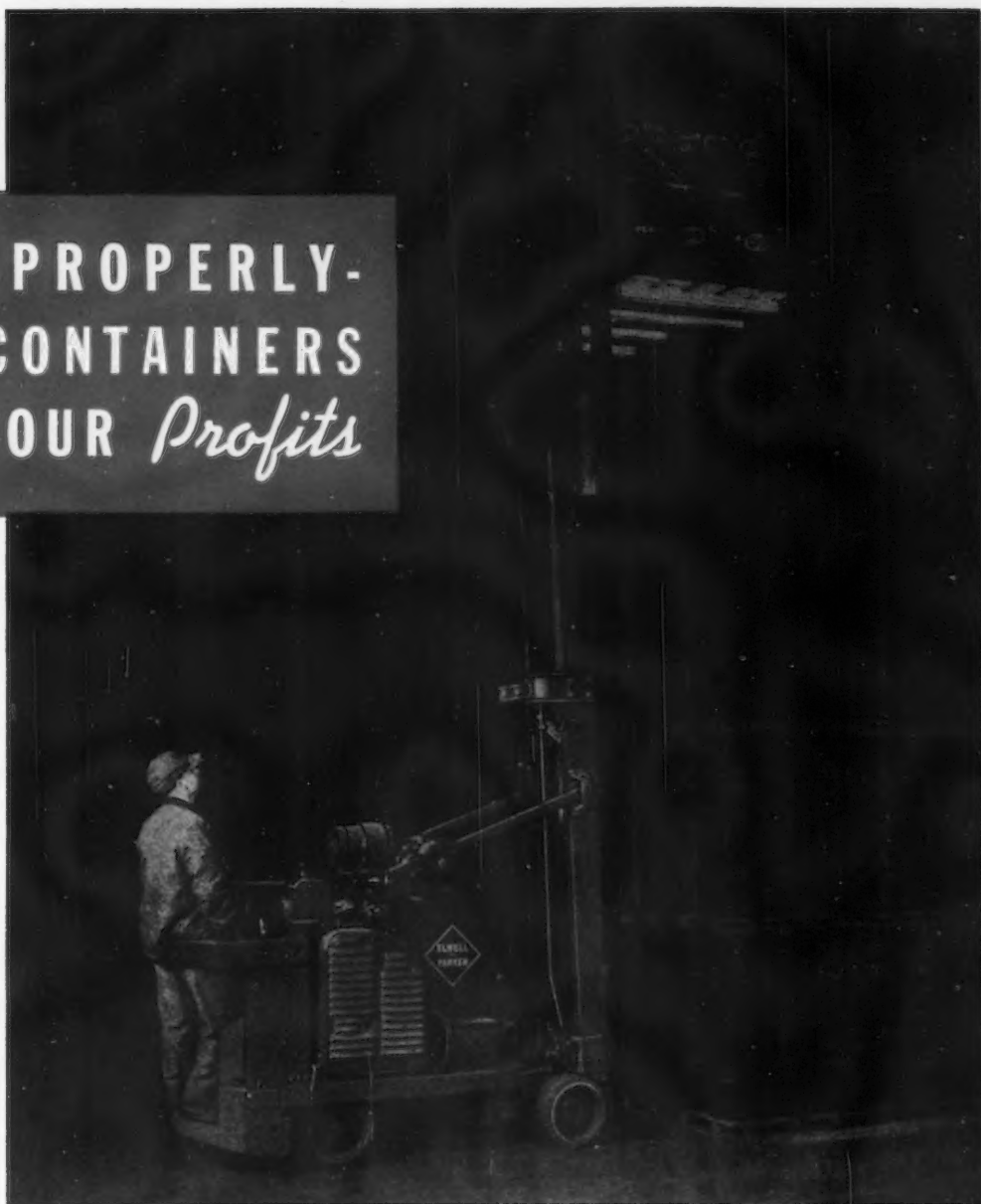
Sessions on April 21 and 22 were devoted to specific electrification problems and their solutions, the papers being contributed for the most part by representatives of machine tool builders and by machine tool maintenance engineers in the automotive and steel industries.

Papers at the first of these application sessions included: "Electrification of Cincinnati Roll Grinding Machines," by W. Tribble, electrical application engineer, Cincinnati Milling Machine Co. and Cincinnati Grinders, Inc.; "An Ambidextrous Machine Tool," by H. Earl Morton, president, Morton Mfg. Co., and O. G. Rutemiller, Westinghouse district engineer, Detroit; and "Electrical Equipment for Control of Hydraulic Motions," by E. E. Opel, electrical engineer, National Automatic Tool Co. Also, "Motor-Operated Chucks for Machine Tools," by George Highberg, superintendent, Cushman Chuck Co., and "Electrical Wiring of

NEWS AND MARKET INDEX

Personals	70	New York Market	108
Obituary	81	Fabricated Steel	110
Steel Ingot Production	98	Non-ferrous Market	111
Summary of the Week	99	Scrap Market and Prices	112-113
Pittsburgh Market	100	Finishing Iron & Steel Prices	114-115
Comparison of Prices	101	Warehouse Steel Prices	116-117
Chicago Market	103	Pig Iron & Raw Material Prices	118
Philadelphia Market	105	Machine Tool Activity	120
Cleveland Market	106	Plant Expansion & Equipment	121

...HOW PROPERLY- SHAPED CONTAINERS *Add TO YOUR Profits*



TO save bigger money in materials handling, you should *begin* planning your Elwell-Parker System* far back of Truck and merchandise, and satisfy yourself that you are packing in the right type containers: Boxes, Barrels, Bags or Bales.

Next, group the containers you have selected on light, inexpensive wooden pallets and handle them exclusively thereafter on Elwell-Parker Power Industrial Trucks, in the largest possible unit loads. Decide now that waste motion in handling is *out* and that new profits are *in!*

Now, with your goods mounted solidly on pallets, your Elwell-Parkers will efficiently load, transport, tier or stack them; reclaim and take to shipping platform (still on original pallets) without manual effort.

Elwell-Parker will help you plan the right System* to save most money for *you*. Call or write Elwell-Parker, 4225 St. Clair Avenue, Cleveland, Ohio.

*The Elwell-Parker System of Materials Handling consists of the correct type, model, power equipment and attachments for a given job, together with a soundly-engineered Plan for adapting them to the owner's particular application, at greatest net savings.

New Type ELWELL-PARKER *Trucks*

ESTABLISHED 1893 • BUILDING POWER INDUSTRIAL TRUCKS SINCE 1906



Machine Tools," by D. K. Frost, electrical engineer, Mattison Machine Works.

"Gearmotors for Machinery Drives" were discussed by L. R. Botsai, gearing sales manager at a gearmotor session held at the Westinghouse Nuttall works during the afternoon of April 21. An inspection trip was also part of this session, which was presided over by R. S. Marthens, manager gearing division.

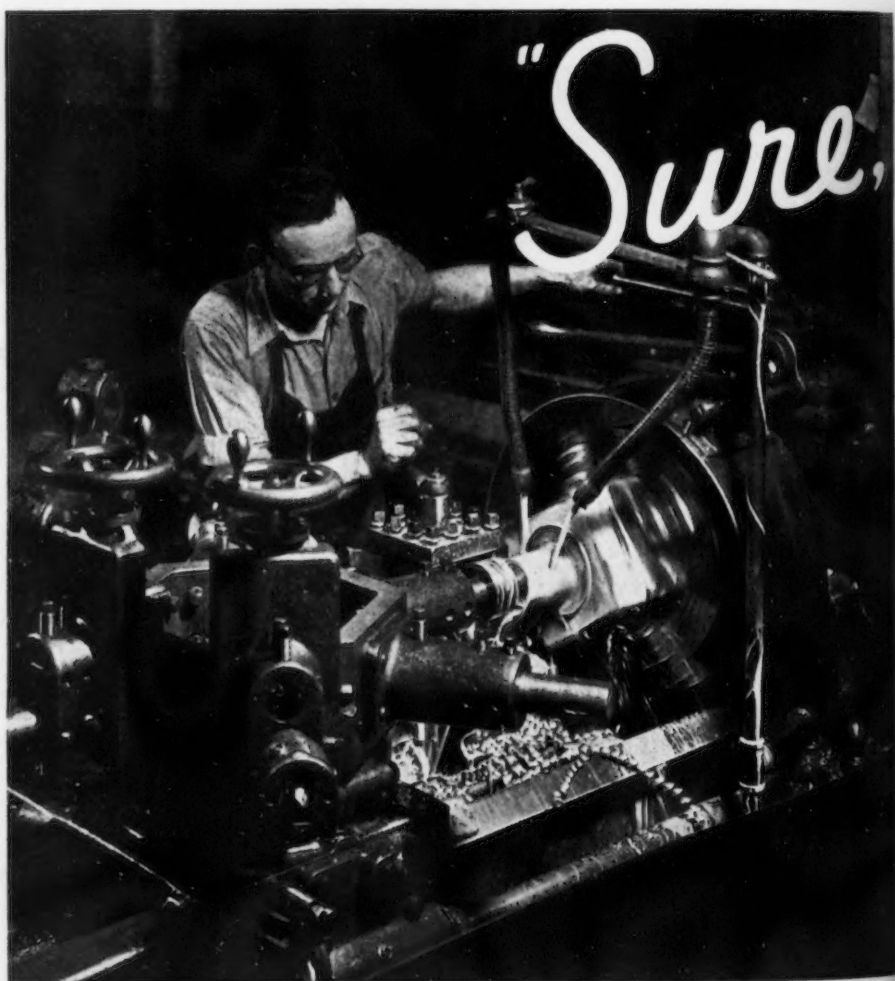
Papers and addresses at the concluding sessions, on April 22, were devoted for the most part to "users' viewpoints" relating to machine tool electrification. They included "Machine Tool Electrical Requirements in the Steel Industry," by J. S. Booth, assistant chief maintenance engineer, Carnegie Illinois Steel Corp., Duquesne works, and "The Application of Power to Machine Tools," by E. L. Bailey, electrical engineer, Chrysler Corp. H. S. Card, development director, National Electric Manufacturers Association, Electric Welding Division, discussed "Welding in the Machine Tool Industry," and B. R. Hill, manager, meter and instrument sales, Westinghouse Newark, N. J., works, addressed the forum on "Meters and Instruments for Machine Tools." The final session was in the nature of an open forum for informal discussion.

New Motors and Controls

Abstracts of some of the papers listed above are planned for subsequent issues of THE IRON AGE. The following brief notes from a few of the papers may serve, however, to indicate the character of the discussions.

R. S. Elberty, in speaking on

DEMONSTRATING the braking of a-c motors during the second machine tool electrification forum held by the Westinghouse Electric & Mfg. Co., at East Pittsburgh, April 19-22. R. S. Elberty, machinery electrification engineer, is at the microphone.



"Motors for Special Applications," outlined the range of characteristics obtainable from various types of motors, and discussed the limitations as well as the possibilities of motors for machine tool drives.

Demand for a low cost, wide speed range planer drive has brought about development of the double commutator planer motor, which has a commutator at each end of the armature and uses a series connection of the armature for speed ranges from 150-300 r.p.m. (50 hp.) and a parallel connection of the armature for speeds from 300-1500 r.p.m. (100 hp.). Several such units are in operation.

A new variable voltage machine tool drive employs a regulator to maintain constant speeds at low speeds and changeable loads. A special control is the main feature, but a d-c motor and motor generator set are also required. Speed ranges as high as 100 to 1 are possible. The equipment is essentially a constant torque drive and the horsepower is proportional to the speed over at least the low speed ranges. Two 35-hp. 40 to 1 speed

range drives are in operation on metal planers.

In a c. motors a recent development has been an adjustable-speed, adjustable torque induction motor for short time applications. This motor has high heating in the windings at low speeds and cannot be used continuously. It was developed for motor-operated chucks, but can be used on valves, work-handling motions, clamps or indexing devices.

Problems of electrical control as applied to machine tools, including large planers and milling machines, were discussed by Mr. Elberty at another session. Interesting data were presented on electric braking and on a new variable voltage control which is said to furnish wider and more accurate speed control than possible with the conventional Ward Leonard system. The new control employs a small motor generator set as a regulator to control the motor speed.

The relation of electronic control to machine tools was discussed at the same session. A paper prepared by E. H. Vedder, electronic

sales engineer, was presented by title, but in Mr. Vedder's absence the subject was discussed by H. C. Jenks, also of the Westinghouse company.

In his preprinted paper, Mr. Vedder pointed out that electronic control has been adapted to machine tools less rapidly than to many other types of machines. One reason has been the lack of general knowledge about tubes and their applications, and another is that machine tools have been developed to such a high degree that it is relatively more difficult to make major improvements in their design. It was said also that perhaps machine and control designers have attempted to use tubes to solve problems which are difficult to solve in any manner. It may be desirable, suggested Mr. Vedder, to acquire an entirely fresh viewpoint and determine whether electronic tubes can be applied to the more ordinary tasks on machine tools. It will also be found, he said, that some machines should be revised to adapt them to electronic control.

Typical applications of electronic control, including relaying or limit switch service, motor control and resistance welder operation were outlined. The paper also gives data on types and sizes of tubes.

Interesting and constructive contributions by users of machine tool electrification equipment included the address by E. L. Bailey, Chrysler Corp., on "The Application of Power to Machine Tools."

When motor and control have been selected, they must be mounted in such a way that they are truly a part of the machine, not an afterthought, he said. "Here we must go back into the design room and do this job right," he continued. "A bracket, a shelf or a bolted on bed-plate may not be satisfactory for either motor or control. Every motor, control mounting and wiring is a separate and important job that must have careful planning wherever it is done. Machines are designed today with special motors, built-in controls and excellent wiring jobs. What I would like to see is the same skill and thought used in applying the standard NEMA frame motors, where they are the logical selection for the job."

The mounting of the control was emphasized as offering greater latitude of choice, but as requiring in some ways more ingenuity to locate the control so that it is completely protected, rigidly supported and readily accessible for maintenance.

In speaking of wiring, Mr. Bailey said that a high-grade wiring job should be made a rigid conduit one

"we picked Warner & Swaseys!"

"Output is what we look for in buying machines. We checked our requirements carefully and found that the Warner & Swasey could step up our production from 3 pieces an hour to 20. We've dealt with Warner & Swasey for years, so we knew we could bank on that figure. Results confirmed this. The only thing we're sorry about is that we didn't run that test years ago."

COE MFG. CO
Manufacturers of wood veneer machinery
Painesville, Ohio

**WARNER
&
SWASEY**
Turret Lathes
Cleveland

as far as possible. Flexible wires and cables should be used even in small wire sizes, with proper terminals and fasteners well located and supported. The wiring should be done with coded or colored wires, as this is a great help in "trouble shooting." The conduits should be within the frame of the machine wherever possible; even the expense of cored openings in the machine castings for conduit and recessed spaces for push buttons, hinged door openings for controllers, etc., would not seem too great an expense to make a complete machine tool, he said.

A plea for more and better "gadgets" was made by E. E. Opel, National Automatic Tool Co., in his address on "Electrical Equipment for Control of Hydraulic Motions." Electrical control of hydraulic motions was summed up as comprising solenoids, valves, limit switches, relays and push buttons. Limit switches were characterized as the most important and the most neglected item on modern machine tools. A good limit switch, he said, should be capable of 8 to 10 million operations without sign of failure, quick break and quick make (no dead spot), and should be dust

tight, splash proof, small and reasonable in price. Starters and motors have been well taken care of and cause little trouble.

Youngstown's Quarterly Net Rose 158 Per Cent

YOUNGSTOWN Sheet & Tube Co. earned \$4,886,019 net in the first quarter this year, an increase of 31 per cent over the final quarter last year and 158 per cent over the initial 1936 quarter. No deduction was made for Federal tax on undivided profits. The earnings, after allowance for dividend requirements on the 5½ per cent preferred stock, equaled \$3.05 a share on 1,534,848 no-par shares of common stock outstanding on March 31. This compares with \$1,897,299, or \$1.41 a share on 1,200,000 shares in the corresponding 1936 quarter.

Allegheny Steel Co. made a net profit in the March quarter of \$551,054 before undistributed prof-

its tax, equivalent after 7 per cent cumulative preferred stock dividends to 65c. a share on 752,285 no-par shares of common stock. In the March quarter of 1936 the company earned \$336,964, or 45c. a share on 612,685 common shares.

Sharon Steel Corp. had net earnings in the first quarter before undistributed profits tax of \$475,778, a new high for any three-month period. The earnings equaled \$1.13 a share on 377,309 no-par shares of common stock after dividend requirements on the \$5 convertible preferred stock. In the corresponding quarter of the previous year, earnings were \$212,616, or 56c. a share on 368,359 outstanding common shares.

The Philadelphia chapter of the American Society for Metals will devote its April 30 meeting to a discussion of "Modern Cast Irons." The guest speaker will be J. S. Vanick, who will present a brief history of cast iron and will summarize the progress which has been made in its processing, alloying, heat treatment, and applications during the past 20 years.

Do you need SPACE in your Stockrooms or Tool Cribs?



This shows how ROTABINS can be installed in your own shelving.

Pioneers in the development, design, manufacture and installation of sectional rotating bins.

Are they crowded?

Do they need expanding?

Do they need relocation?

Are you planning new ones?

Do you want to save Time and Space?

IF SO

Rotabin sectional rotating steel shelving will help to solve these problems.

Rotabins save 40-60% of floor space.

They increase present floor space capacity and can be used with present shelving.

Write us for catalogue. No obligation.

THE FRICK-GALLAGHER MFG. CO.
WELLSTON OHIO



OUTPUT AND QUALITY INCREASE

WHEN USING NORTH AMERICAN COMBUSTION EQUIPMENT



LUMINOUS FLAME BURNER
PROPORTIONING
VALVE



TURBO
BLOWER



THE NORTH AMERICAN MANUFACTURING COMPANY
CLEVELAND, OHIO

Pig Iron and Scrap Shortage in Britain a Serious Factor

AN interesting review of the situation in the British steel industry brought about by shortage of pig iron and scrap was published recently in the *Statist* of London, and is reprinted here because of the effect that the British raw material shortage has had

upon demand for pig iron and scrap in the United States:

"An announcement made during the Easter week-end serves to emphasize the particular difficulty which the iron and steel industry is now having in securing adequate supplies of raw materials. Half

the productive plant of the Lanarkshire Steel Works at Motherwell, which is controlled by Colvilles, Ltd., has been closed down indefinitely, the reason given for this step being the shortage of scrap and pig iron.

"Colvilles is the largest steel producer in Scotland, its output being the main source of supply for the Clyde shipbuilders, as well as being in active demand for the other purposes connected with the steel industry and possessing the prospect of substantial armament orders.

"In present circumstances, with intense shipbuilding activity on the Clyde, with a brisk demand for steel for other purposes, and with the prospect of accelerated expenditure on armament projects, the inquiry for steel in Scotland has been running substantially in excess of the supply, and it has become increasingly difficult to secure early delivery. Thus, with demand probably not yet at its peak, the shut-down at the Lanarkshire works implies a possible suspension of industrial progress which it will take time and effort to rectify.

"The position in Scotland, in view of the recent action by Colvilles, is of topical interest but in other parts of Great Britain the shortage is no less acute and is already giving rise to considerable anxiety. The fact that it may have wide repercussions, not only on the plans for rearmament, but also on the general productive capacity of industry, was shown recently in the chairman's annual address to the shareholders of Clarke, Chapman & Co. While reporting a very large growth in the amount of work on order, the main difficulties which the chairman foresaw were not only a shortage of raw materials, but also a difficulty in obtaining delivery against orders of machine tools. Makers of these tools are embarrassed, not only by the limitations imposed by their own productive capacity, but also by the difficulty of obtaining adequate supplies of their raw materials. There is a big demand for reconditioned tools, and every effort is being made to reduce to a minimum the time required for the adaptation and adjustment of the few second-hand tools which become available. The basic cause of the difficulty, however, inevitably goes back to the raw material position of the industry which, with large demands unsatisfied and shipbuilders having to wait several months for the delivery of steel plates, shows that demand is pressing heavily upon a level of production already at record levels and pressing in its turn upon the productive capacity of the industry.

"Unfortunately the capacity for

Of Course You Know —

There is no *universal* cleaner in this day of specialization. Wyandotte Metal Cleaners are highly specialized, to keep step with 1937 production methods—But—
Wyandotte No. 140 excels in a surprising variety of metal cleaning jobs. Here are a few examples—

- (a) One plant cleans daily six (6) tons of die castings prior to plating—with Wyandotte 140.
- (b) Another manufacturer uses Wyandotte 140 to turn out a heavy production of plumbers supplies.
- (c) No. 140 cleans 11,000 automobile bumper-bars daily.
- (d) Job platers use No. 140 because it cleans job work efficiently. They say it is the nearest to a universal cleaner.



May we co-operate with you, too?

Wyandotte
Clean "Chemically" Clean
Metal Cleaners

THE J. B. FORD COMPANY

WYANDOTTE, MICHIGAN

There is a Wyandotte Supply House and a Service Representative in your vicinity.

pig iron production is not susceptible to rapid increases, considerable time being needed for the erection of new furnaces and the capital outlay involved being on a large scale. It must also be remembered that these considerations of time and capital make it necessary that ironmasters should take a long view; and, with this factor in view, it is clear that there is little incentive for major capital work in the pig iron industry. The present demand, stimulated by armament orders, by building construction, and by the work involved in adapting British industrial economy to the implications of a tariff policy, is necessarily of an abnormal kind; and, though it may endure for a time, cannot be expected to last forever. In such circumstances, the prospective builders of new furnaces may well search for precedents, and in the multitude of obsolete and long-idle furnaces which now lie unkindled they will see the obvious penalty involved for an industry which inflates its capital equipment to deal with an abnormal demand. Not only is the present demand abnormal, but its abnormality is in some degree obscured by the fact that exports are considerably less than normal; and the position of the industry is, for this reason, the more vulnerable.

"In such a position the most obvious solution is to seek further supplies of pig iron from oversea. A first step in this direction was taken at the beginning of March, when the 33-1/3 per cent duty on imported pig iron was dropped. Simultaneously, in order to alleviate interim shortages at later stages of production, there was a reduction from 20 per cent to 10 per cent in the duties charged on iron and steel products imported with a quota certificate and certificates of origin. More recently, with effect from the beginning of April, the specific duty of £3 per ton on cut steel bars was also suspended, these bars forming one of the most important raw materials of the special steel industry, which, in view of the rapid technical progress of recent years, may prove to be an important factor in the development of the armament program. So far as pig iron is concerned, however, the abolition of the import duty does not appear as yet to have had any very great effect. The movement towards rearmament is now world-wide and, with other demands also facing the world's steel industry, the world's surplus of pig iron is unlikely to be substantial and foreign ironmasters are influenced by the same considerations of policy as have affected their British colleagues. It is reported, indeed, that arrange-

ments have been made for the shipment of an additional 400,000 tons of basic pig iron by the Indian Iron & Steel Co.; but further negotiations for half a million tons from Russia appear likely to break down in view of the fact that so large a surplus is not believed to be available.

Japan Accentuates Scrap Shortage

"The shortage of pig iron might be alleviated if it were possible to bring about a substantial increase

in the supply of scrap, which can be used up to about 90 per cent of the charge of a modern basic steel furnace. In this section, however, the shortage is not only acute but world-wide, and is accentuated by the aggressive buying policy of Japanese purchasers. In this connection it is of interest to note that the chief foreign source of supply is the United States, and that, of 21 cargoes chartered in January, no less than 14 were for Japan, while Italy had four and Great

"Lifts More — Cuts off Quicker Hangs on Better"

"Unloads Car of long Rails in 20 minutes" says another EC&M Magnet User

Steel Mills, Foundries, Scrap Dealers and Ocean and Gulf Loading Ports find EC&M Lifting Magnets are indispensable assets in the economical handling of their scrap, raw and finished products. The lifting magnet not only results in better profits during normal working hours but, when required, permits 24-hour service without tiring... and without prohibitive overtime charges. Investigate the advantages of an EC&M Lifting Magnet today. Write for Bulletin 900 describing these efficient, long-life tools. It contains over 30 illustrations showing a few of the many things that can be successfully handled by these modern magnets.

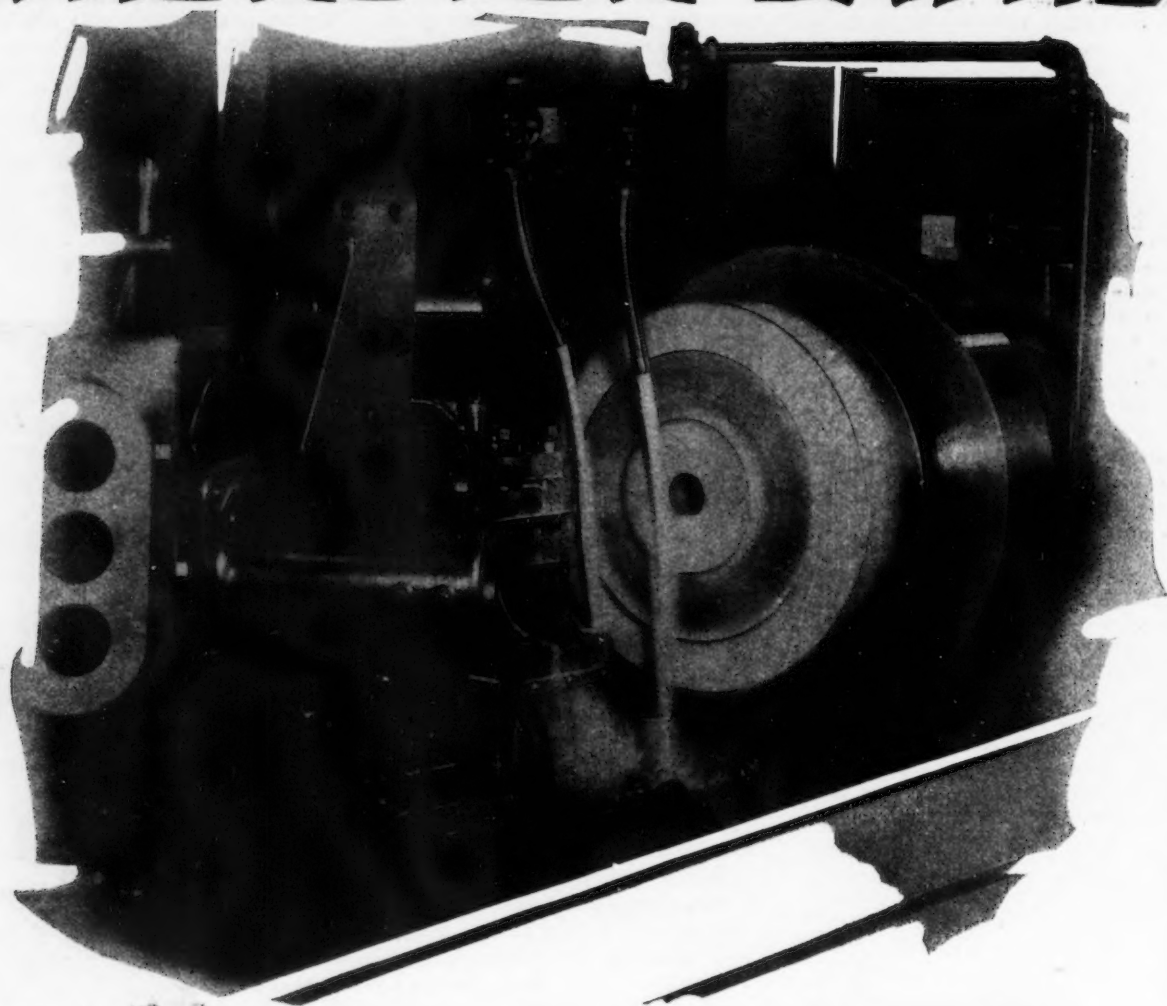


THE ELECTRIC CONTROLLER & MFG. CO., CLEVELAND, OHIO



EC&M LIFTING MAGNETS

WHEREVER LATHES



SUNOCO

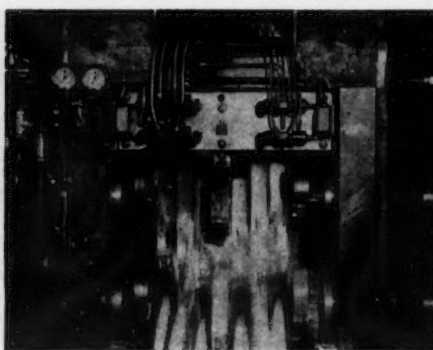
EMULSIFYING
CUTTING OIL

BULLARD Turning 9-inch, S. A. E. 3125 crown gear blank.



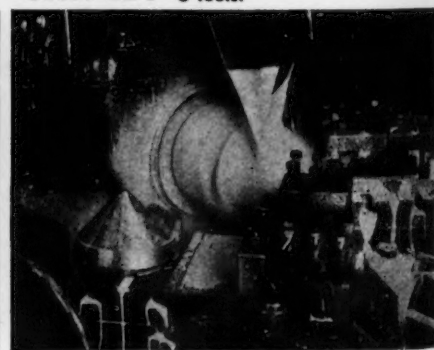
Courtesy of The Bullard Co.,
Bridgeport, Conn.

LEBLOND Finishing all pins for grinding on six-throw crankshaft.



Courtesy of LeBlond Machine Tool Co.,
Cincinnati, Ohio

LODGE & SHIPLEY Finish-turning, tapering, facing and forming bit cone; 6 tools.



Courtesy of Lodge & Shipley Machine Tool Co.,
Cincinnati, Ohio

ARE OPERATED—

Sunoco has won widest recognition for

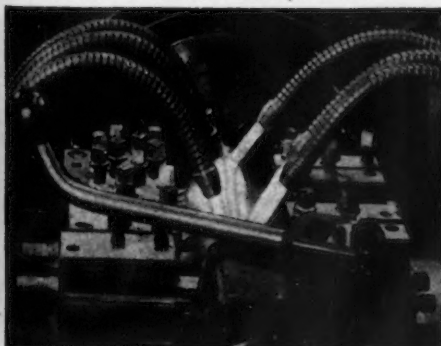
- Aiding Machines to Produce at Rated Capacity
- Precision Work, Even at Higher Speeds and Feeds
- Longer Tool Life
- Better Finish
- Fewer Rejects

These same definite, outstanding advantages of Sunoco Emulsifying Cutting Oil are available for your plant, under your own operating conditions. And our experienced Cutting Oil Engineers, whose cooperation has been found so helpful by others, are also at your service.

SUN OIL COMPANY, PHILADELPHIA, PA., U. S. A.

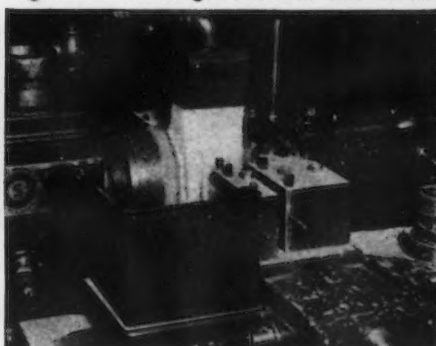
Sun Oil Co., Ltd., Montreal, Canada • Subsidiary Companies: British Sun Oil Co., Ltd., London, Eng.

MONARCH Turning and facing all straight and taper sections of an auto rear axle, in one operation.



Courtesy of Monarch Machine Tool Co., Sydney, Ohio

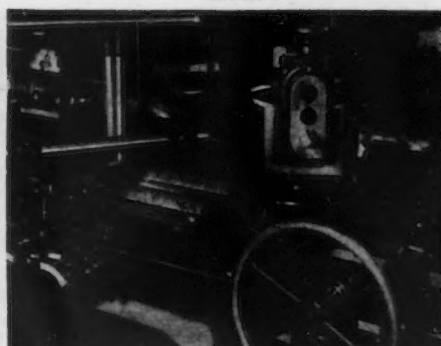
SUNDSTRAND Rough turning, facing, chamfering, and forming tractor cluster gear. 10-inch Stub Lathe.



Courtesy of Sundstrand Machine Tool Co., Rockford, Ill.

WARNER & SWASEY

Turning, drilling, facing. W. & S. 3A Saddle Type Lathe.



Courtesy of Warner & Swasey Co., Cleveland, Ohio

Britain three. It will be recalled that during February an agreement regarding scrap supplies was reached between the British Iron and Steel Federation and the National Federation of Scrap Iron and Steel Merchants; but in the absence of new sources of supply it is clear that the power of these organizations is limited, and it has certainly not yet been effective in increasing the available supplies. A scrap cartel has, in the meantime, been formed among the countries which are signatories of the steel cartel, the main purpose being to prevent prices from becoming prohibitive; but here again the effect of the possible arrangements is likely to be small unless it is possible to find fresh sources of supply. Japan, it is also to be noted, is not a member of the new scrap cartel; and the large Japanese demand for scrap seems likely to accentuate the shortage and continue to affect the price.

"In the meantime the position in this country is rather more acute than in other European nations, because quotations for scrap have been kept substantially lower than those ruling on the Continent. It is not clear why this disparity should exist, but it may be that

the relatively large proportion of older plant in this country renders higher prices uneconomic. Apart from foreign supplies of scrap, the most important source of supply is the breaking up of old ships; and it is significant that, under the stimulus of the high prices now ruling, there is a growing tendency for British ships to be sold for breaking in foreign yards. On present indications, it would seem likely that, with rising prices, the tendency towards foreign sales will be accentuated.

"The difficulty of such a position is enhanced by the fact that no easy solution presents itself. Demand is everywhere abnormal, and its permanence is not sufficiently assured to justify the major capital expenditure necessitated for an increase in capacity. In this connection, a different view may be taken by the governments of countries in which armed security is preferred to economic well-being; and it is to be noted that Italy as well as Japan is a substantial buyer of scrap. In Britain, however, the shortage continues to be acute, and this condition seems likely to remain. Already the inadequate supplies of structural steel are serving as a check on the building

industry, and the president of the Midland Federation of Building Trades Employers has complained that, whereas builders secured their orders by open competition, they were forced to buy their materials at the prices fixed by gigantic and controlling combines. Sir William Larke, a director of the British Iron and Steel Federation, has laid down the principle that the rise in steel prices must be passed on to as small an extent as possible to the final consumer. But with the present shortage of material and the present and prospective accentuation of demand, it is difficult to see what can prevent steel prices from rising in a manner capable of inducing much industrial dislocation. As an alternative, it is possible that a scheme of controlled distribution may be formulated and introduced, in which case it is to be presumed that orders connected with Government requirements will receive absolute priority. Already there are plans under discussion for the rationing of billets and bars to the re-rolling mills; and this, in common with all schemes of official or semi-official interference, is giving rise to much trade criticism. Smaller considerations, however, must of necessity give place to greater; and if disproportionate price increases are to be avoided, the means taken to avoid them may well be proportionate to the national emergency which has produced the program of rearmament."

French Iron and Steel Industry Busy

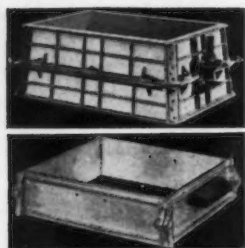
LONDON (Special Correspondence).—Paris reports state that the functions of the International Steel Cartel have become very limited since the recent abolition of the fines payable by members who exceeded their export quotas. The cartel took this step because, due to the greater demand for iron and steel in all markets, there was no further need for export restriction.

In France many of the smaller concerns specializing in the manufacture of articles of domestic utility are suffering from the burden of the new social laws. They have been forced to increase their prices to such an extent that their orders have gradually fallen off. The 40-hr. week has also greatly increased their operating expenditure. On the other hand, not for many years have the big undertakings had such heavy orders.

In France, Belgium, and Luxembourg the present is a time of intense activity in iron and steel.



Blast Cabinet



Flasks and Jackets



Rod Straightener



Important American Line Equipments!



Core Machine

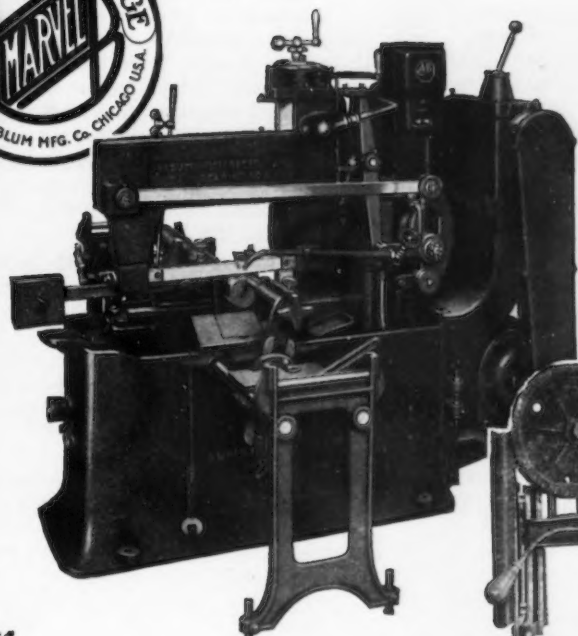
Here are five of America's time-saving units. The American Rod Straightener—a fast, efficient device for bending gagers, cutting and straightening wires and rods. The American Core Machine—a high speed, low cost unit for making stock cores in many shapes and sizes. An American Blast Cleaning Cabinet—one of many types and sizes available for blast cleaning of castings and small parts of many materials. American "Featherweight" Flasks and Jackets—the ideal combination for fast economical production of small to medium size bench and floor molds. These are just a few of those important accessory equipments that are American specialties. Almost every foundry and metal working shop executive is acquainted with the major equipments of the American Line—WHEELABRATORS, dustube Collectors, and Sand Cutters. But the many accessory units of the American Line are just as important in their applications and just as effective in cutting production costs. May we send you descriptive literature on any unit or machine of the American Line?

THE AMERICAN FOUNDRY EQUIPMENT COMPANY
510 So. Byrkit St., Mishawaka, Indiana



Makers of Abrading Equipment for every metal cleaning operation—dustube collectors, sand cutters, and other foundry equipments.

MARVEL SAWS



for
Versatility

THE MARVEL No. 8 Metal Band Saw is the truly universal metal cutting saw, handling all work from $\frac{1}{8}$ " x $\frac{1}{8}$ " to 18" x 18". It is one of the most versatile multi-purpose saws built. With its planer-type bed, hand or power feed, and swinging saw carriage that will feed the blade into the work at any angle from 45° right to 45° left. It will save labor and costly hours cutting out die plates or roughing to form and shape. It will miter, notch, and cut-off large work rapidly, or will nip off the smallest rod cleanly—will handle the heaviest job or the most delicate cut with equal efficiency. It is definitely a part of every complete Tool Room.

for **The Toughest Alloy Steels and Largest Sizes**

The modern trend to tougher alloy steels and ever increasing stock sizes demands new capacities, higher speeds, and heavier feeds in hack saws. Now comes the MARVEL 18, a giant hydraulic hack saw advanced in engineering, sawing principle, and performance—the saw of today that will meet the demand of tomorrow.

- Simplified, trouble-proof Hydraulic feed.
- Handles the toughest steels in sizes to 18" x 18".
- "Roll Stroke" Blade Action; The blade dips into the cut with the free, chip clearing action of a carpenter's hand saw.
- Swinging Saw Carriage; Saw carriage swivels to any angle indexed.
- Heavy Construction; Heavy, sturdy with armoured parts, this saw is built to withstand the rough handling certain where large work is done.

WRITE FOR BULLETINS

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

349 N. Francisco Ave., Chicago, U. S. A.

for

Automatic High Speed Production

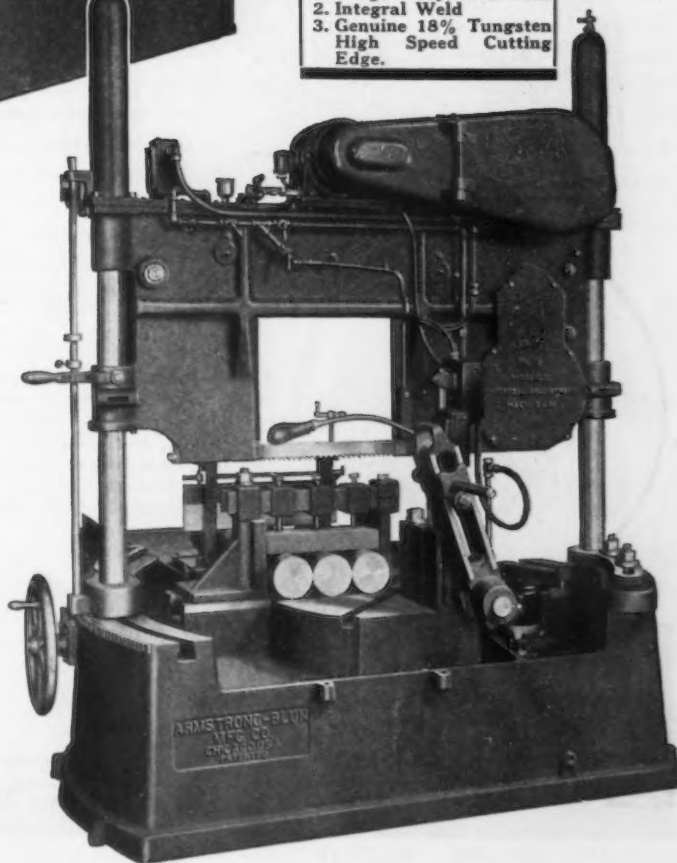
No. 27-28 at the
Foundry Show
May 3 to 7
MILWAUKEE
WISCONSIN

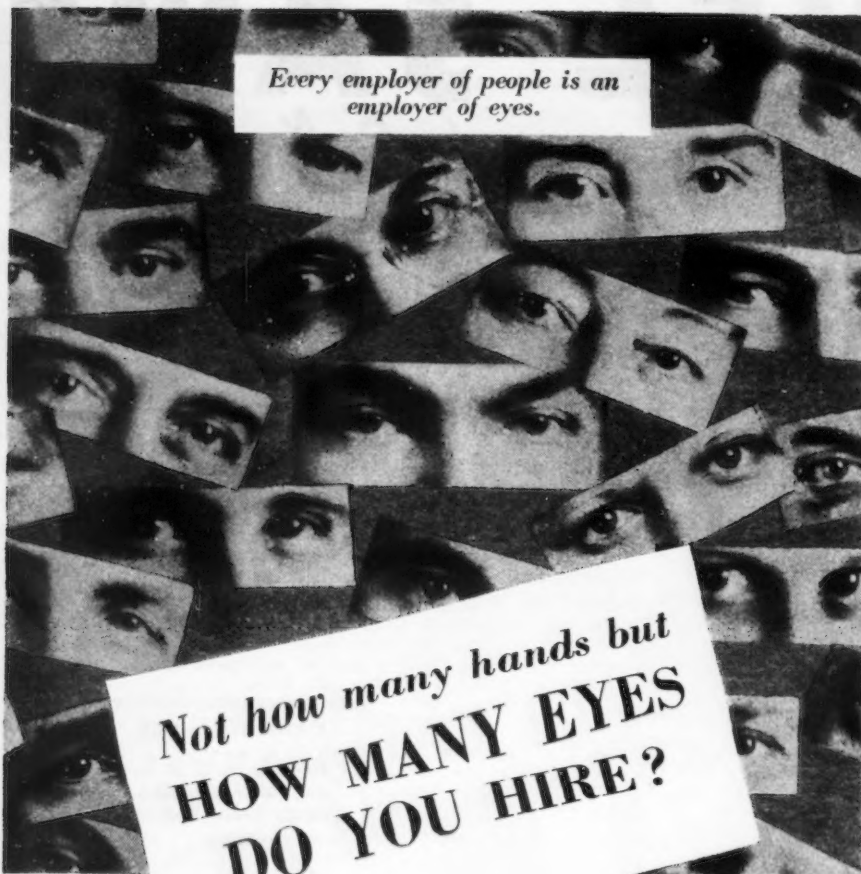
ONE MARVEL HIGH SPEED Saw with automatic bar push-up . . . will save machine hours and labor . . . will cut cutting-off costs per piece to a fraction. All-ball-bearing construction, these new MARVELS are built for continuous operation at speeds, feed pressures, and blade tensions impossible heretofore. They will cut off identical lengths from bar stock (gear blanks for example) 10 pieces 6" round or 160 pieces 1½ inches round per hour, floor to floor. Absolutely dependable, they will hold their place in any production line—will saw straight, accurately and fast.

**UNBREAKABLE
MARVEL
High-Speed-Edge
Hack Saw Blades**



1. Tough Alloy Steel Back
2. Integral Weld
3. Genuine 18% Tungsten High Speed Cutting Edge.





Every employer of people is an employer of eyes.

Not how many hands but
HOW MANY EYES
DO YOU HIRE?

Industrial eyes especially need more light these days to see close manufacturing limits and measurements which are so increasingly important. One way to give them all the light you pay for is to insist on using Edison MAZDA lamps . . . the kind that *Stay Brighter Longer* and provide the maximum amount of light for the current consumed.

Few people realize what a vast difference in quality there is between

Edison MAZDA lamps and many of the substitutes offered. Actual photoelectric measurements show that inferior bulbs often give 30 per cent less light than good lamps of equal wattage. And even a 2% loss is poor economy for the industrial or commercial user of light.

To save men and money in your plant, use only good lamps . . . such as Edison MAZDA lamps. The General Electric trade-mark on the end of each bulb assures you of full lighting value for your money. General Electric Company, Dept. 166, Nela Park, Cleveland, Ohio.



THE G-E LIGHT METER measures lighting. It tells whether employees are getting light for easy seeing, and is helpful in checking from time to time on whether this amount of light is being maintained. Costs only \$11.50.



EDISON MAZDA LAMPS

GENERAL  ELECTRIC

They stay brighter longer →

Asks for Extension Of Welding Code

NOW that construction is on the upgrade, in a recent interview H. S. Card, development director, Electric Welding section, National Electrical Manufacturers Assoc., pleaded for wider extension of welding in building codes. In most cities welding is legislated against simply by not being mentioned in regulations that govern the erection of private and public buildings. Yet it is a process that frequently offers marked advantages to the builder.

The safety of welded building construction has been thoroughly and completely established, according to Mr. Card. As a preliminary step in 1927, 42 welding operators in as many widely separated shops were asked to weld a set of typical structural connections. The uniformity with which these sample joints met the computed requirements for strength and safety was amazing even to the most ardent proponents of welding. Thus it was established that reliable workmanship can be predetermined by means of operator qualification tests, and that certain design values for welds can safely be accepted. This was the work of the Structural Welding Committee of the American Welding Society, whose report was published in 1931.

Later the American Welding Society produced a model code for the use of welding in building construction. In this code are safeguards more inclusive and more exacting than the average board of building inspectors could devise, because it was drawn up by welding experts. Every precaution has been taken to prevent unsafe design and poor workmanship. In 24 states, the A.W.S. code, or codes that are substantially the same, have been adopted locally. Within two years over a hundred structures have been welded, and there have been no failures to date.

The N.E.M.A. Welding Section has recently been asked to cooperate in the revision of several municipal building codes. Mr. Card believes that the use of welding should be allowed in all building codes, now that the initial development work of making welding safe has been accomplished.

The Middleton Iron & Steel Co., newly formed subsidiary of David Joseph Co., moved into its Middletown, Ohio, offices this week. This company, recently formed, is to supply all the scrap needs of the Middletown unit of American Rolling Mill Co.

ULTRA-CUT STEEL

The Ally of Time

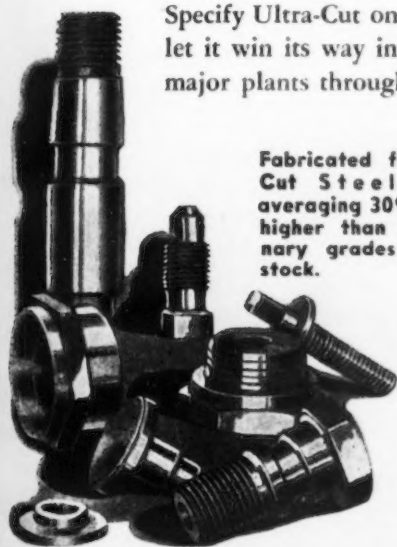
TIME rode on the side of the minute men in '75. Rallied to action by a midnight call to arms, they assembled a patriot army in a few hours and repulsed the shock of trained troops, winning a victory that lives to this day.

In the modern battle against rising costs, *time* allies itself with the practical production man, who enlists the aid of B & L Ultra-Cut Screw Stock in making duplicate machine parts.

This fast cutting screw steel is developed to meet the requirements of the latest types of automatic high speed equipment. It permits the machines to be set at maximum rates of feed and spindle speed.

It behaves well under the tool, machining to a bright, smooth finish with clean-cut threads and perfectly formed edges . . . the chips fall away freely . . . rejections are held to a minimum . . . and close manufacturing tolerances are readily maintained.

Specify Ultra-Cut on your next order for screw stock, and let it win its way into your production work, as it has in major plants throughout industry.



Fabricated from Ultra-Cut Steel at rates averaging 30% to 40% higher than with ordinary grades of screw stock.

**Cold Drawn Bars
Ground Shafting
Screw Stock
Special Sections
Alloy Steels**

Awaiting final signal
from Old North Church

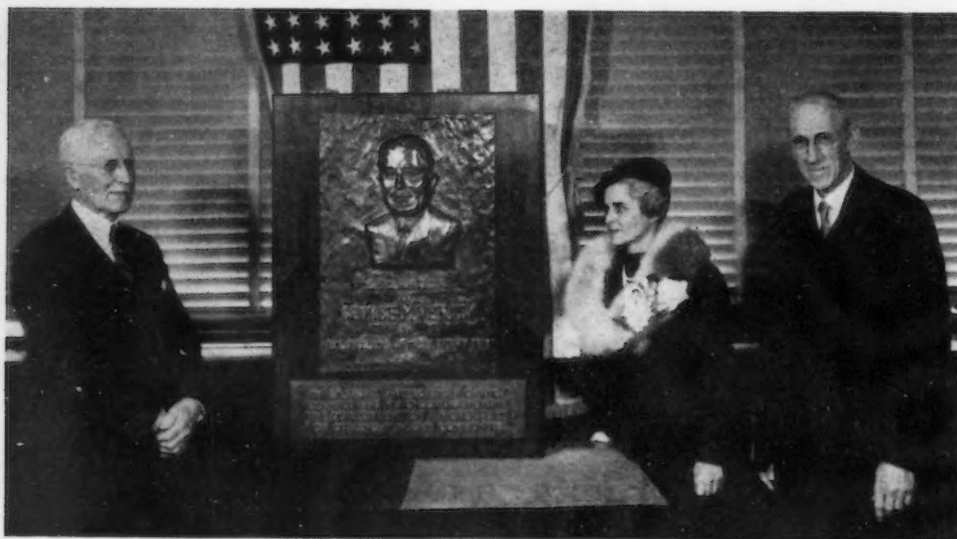


BLISS & LAUGHLIN, INC.

HARVEY, ILL.

Sales Offices in all Principal Cities

BUFFALO, N.Y.



IN appreciation of his example and encouragement in the development of a higher type of citizenship, fellow townsmen of Middletown, Ohio, on April 21 presented George M. Verity, left, chairman of the board, American Rolling Mill Co., with a bronze plaque bearing his likeness. Mrs. Charles R. Hook, daughter of Mr. Verity and designer of the bas relief, is shown at the right, together with D. E. Harlan, chairman of the Verity Day Committee which honored Mr. Verity last June.

G. M. Verity Discusses Labor Relations

WHEN capital and labor recognize the importance of working together in a cooperative spirit, both will be in the best possible position to profit, George M. Verity, founder and chairman of the board, American Rolling Mill Co., asserted in a nation-wide radio address on April 23.

Observing that 50 years' experience in industry had convinced him that the interests of capital and labor are identical, Mr. Verity said that both should realize that the source of all wealth is production and that anything that interferes with efficient productivity is detrimental to their mutual interests.

"Unless industry is productive and prosperous, it cannot yield better returns through a panacea of

legislation, or through any arbitrary action on the part of management or men."

"Furthermore," Mr. Verity continued, "we should not confuse high hourly rates of pay with high annual earnings. High hourly rates may of themselves be relatively unimportant; high annual earnings are of tremendous importance. Men buy homes, automobiles, radios and other comforts and conveniences with the actual dollars earned over a substantial period of employment, not with imaginary dollars to be created by a high rate of wage per hour with but few hours of employment.

"In a final analysis, the public really determines the wages that can be paid. When costs create prices which the public cannot or will not pay, then orders cease, employment is retarded, and wages decline."

British Scrap Plan Ready to Function

LONDON (*Special Correspondence*). — The Central Steel Scrap Agency established by the British Iron and Steel Federation will shortly be in active operation. No official prices have been issued so far.

It is understood that when the agency starts work the only official prices which will be published are those at which merchant members of the National Federation of Scrap Iron and Steel Merchants are prepared to buy from suppliers of scrap metal. Quotations agreed upon between the steel manufac-

turers and the Federation of Scrap Iron and Steel Merchants are not to be officially disclosed.

Under the plan steel manufacturers are to restrict their purchases of scrap to members of the merchants' federation and non-members will have to dispose of their supplies through members of the federation. In this way it is hoped to secure better organization of the trade and make cooperation between the steel makers and the scrap merchants easier of attainment.

It is recognized that the new organization cannot increase the tonnage of scrap in existence, but it is anticipated that it will permit of more efficient collection. It will also check exports of scrap from

the United Kingdom, as the merchants' federation has agreed with the British Iron and Steel Federation not to export material needed by the home industry. This will be very advantageous to the steel trade, for exports of scrap in 1936 averaged 11,600 tons per month, and in January this year amounted to 33,100 tons and in February to 23,900 tons.

The agreement entered into between members of the European Steel Cartel of a quota basis for scrap purchases will also help in reducing the competition for supplies which was tending to send prices to exorbitant levels.

The British Iron and Steel Federation's efforts to purchase foreign scrap have been fairly successful and during the next three months the result of these efforts will become increasingly apparent. Imports of scrap iron and steel from all sources in 1936 averaged 90,400 tons per month, but for January and February this year amounted to only 35,200 tons and 22,700 tons respectively.

Some 10,000 tons of scrap iron valued at \$150,000 has been shipped from Bombay to Japan in 23 ships during the last few weeks. With prices for scrap iron rising throughout the world, Japan has been turning to India, where the market is cheaper than in Europe and America, for her supplies. Almost every freighter leaving India for Japan lately has carried a heavy load of scrap.

The remarkable increase in Japan's purchases of scrap iron from India is revealed in export statistics, which show that during the last 12 months India's exports of scrap iron to Japan have almost doubled compared with previous years.

CLEVELAND TRAMRAIL MATERIALS HANDLING EQUIPMENT

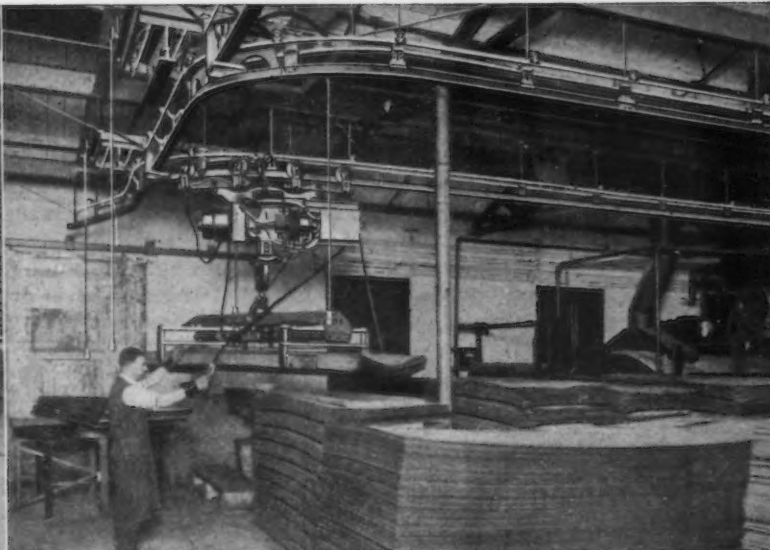
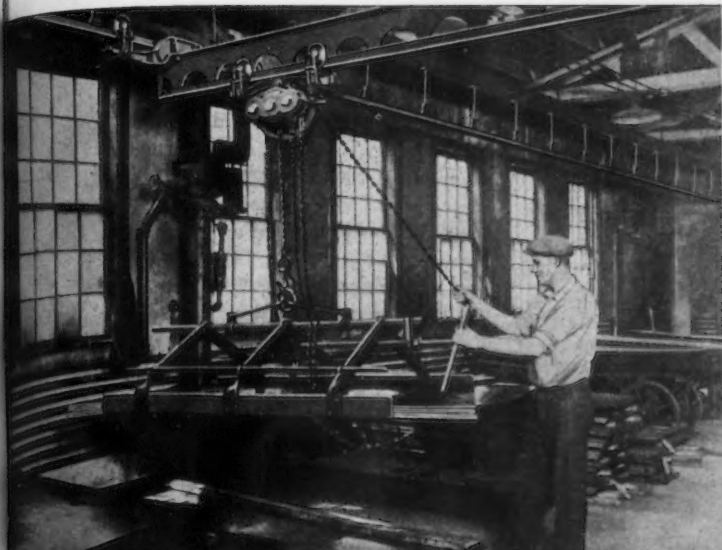


Photo 2020B Hand Propelled carrier chain hoist and hand operated grab.

Photo 2110

Photo 2110 Hand Propelled carrier with motor operated hoist and grab, both push button controlled.



Consult your 'phone directory under Cleveland Tramrail

● Costs of handling Sheet steel can be reduced better than fifty per cent (50%) by Planned Unit Loads.

● A Cleveland Tramrail System will handle these planned loads to storage and from storage and through processing at the speed required to become A Pace Maker to Production.

CLEVELAND ALL WELDED CRANES FOR EVERY INDUSTRY

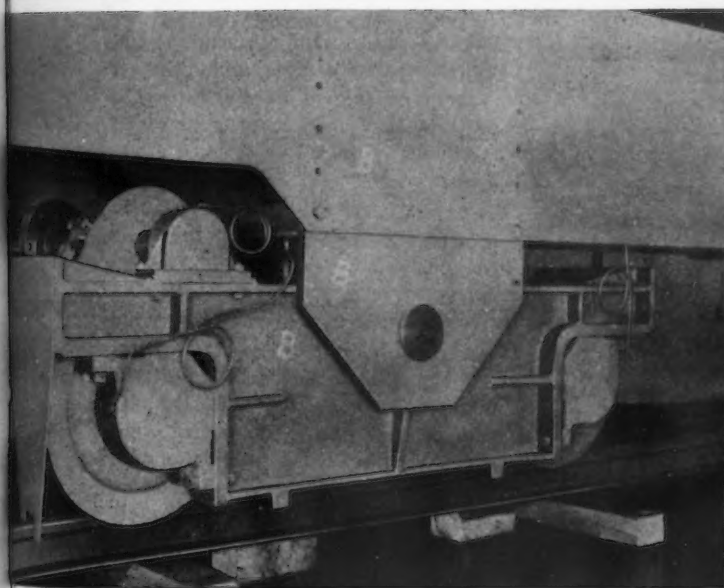


Photo 2140

At the left is shown an Equalizer truck of an eight wheel heavy duty crane.

All Welded end Trucks of Cleveland Cranes entirely made of "worked" steel, every pound of which is placed where it does the most good.

Less weight, less wheel loads, smaller motors. BUT greater strength more rigidity and increased acceleration.

CLEVELAND



CRANES

NEW YORK • DETROIT

PITTSBURG • CHICAGO

THE CLEVELAND CRANE & ENGINEERING CO.

1115 DEPOT ST.

WICKLIFFE OHIO

Cost Factor in Crane Economy

(CONTINUED FROM PAGE 53)

double pier of the Western Maryland Railway Co. The suspended spans of this gantry crane project over the boats moored to either side of the pier; the mid-section spans four railroad tracks. The crane equipment may be moved freely along the length of the pier

to reach any point of the boats or the railroad cars. Material is handled directly from the boats to the cars, or vice versa, with dispatch.

Of particular interest to readers of *THE IRON AGE* is the illustration of the Shepard-Niles Crane & Hoist Co. transfer crane with cupola-charging hoist. In a New England foundry eight men with this equipment do all the yard handling and charging for a daily melt of 100-150 tons. Previously

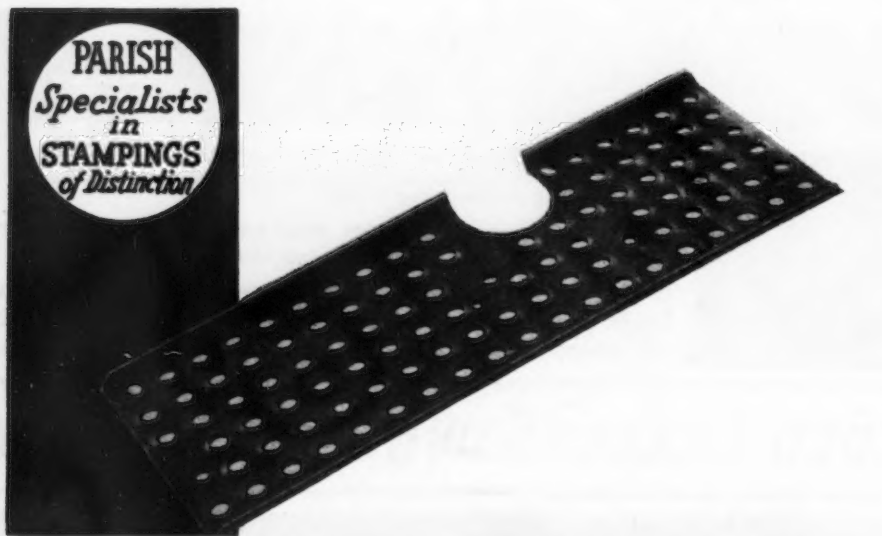
44 men were required to do the same work. The crane has a 68 ft. span. Suspended from it is a mono-rail section which matches up at various points with similar mono-rail section overhead spur tracks, permitting the cab-controlled hoist to travel off the crane section onto the overhead trackage system leading to the cupola. The cupola-charging hoist may be turned end for end on a turntable situated on one of the spur tracks, and since the snout of this hoist will project 2 ft. 7 in. beyond either side of the crane span, an effective yard coverage width of 73 ft. 2 in. is gained.

A Shepard-Niles gantry crane is also shown, as used in a railroad freight yard in connection with the L.C.L. container method of shipping freight. A filled container is being taken from a railroad car to a motor truck, whence the container will be delivered to the consignee without being opened from the time it left the shipping rooms of the consignor.

The Cleveland Crane & Engineering 10-ton crane shown installed in the coiled strip metal storage room of a mid-Western steel company has a span of 65 ft. The bridge girders, trucks and the trolley are all constructed of welded steel, forming structures at once extremely rigid and light. A special U-shaped carrier attached to the hook picks up several of the coils of metal at once.

Summary

Crane selection should be based first of all on a planned handling service. The factors of capacity, frequency of use, area to be served and lift desired being fixed, select that crane which will give you dependable, safe, rapid service with minimum weight. Look into the costs of operation and maintenance of similar cranes installed under conditions of service approximately equal, so that you may judge what your own upkeep costs may be. Consider the ease afforded for lubrication and other maintenance work, and also the accessibility of parts which may have to be replaced because of wear. Consider the factor of safety in all its implications; and do not forget to take into consideration the reputation of the crane manufacturer. Remember that the first cost of a crane is the least cost; the costs-after-installation are the biggest factor in heavy crane economy.



Safety for the Brakemen

Neither the gauge, size nor specifications of a stamping presents any obstacle to Parish. Skill, experience and equipment combine to make difficult stampings comparatively easy in Parish shops.

This non-skid brake step for box cars is $\frac{1}{4}$ " thick x 30" long x 10" wide. The flange is 1". Embossing around the holes makes the step non-skid. Another of the many types of stampings produced by Parish for many industries.

Have you a problem that could be worked out in pressed metal? Our engineers will do it for you.

PARISH PRESSED STEEL CO., Reading, Pa.

PACIFIC COAST REPRESENTATIVE
F. Somers Petersen Co., 87 California St., San Francisco, Calif.

PERSONALS

(CONTINUED FROM PAGE 73)

H. O. HARTDEGEN has been placed in charge of the territory comprised of northern New York State and eastern Pennsylvania by the Driver-Harris Co., Harrison, N. J., succeeding J. B. SHELBY, who has been advanced to the management of the foundry division, where he will act as co-manager with J. SAMMON.

A. T. BROWN has been made a member of the board of the Caterpillar Tractor Co., Peoria, Ill.

ERNEST H. TAYLOR has been elected vice-president in charge of production of the International Boiler Works Co., East Stroudsburg, Pa., and will have complete charge at the factory in that city. JOHN B. KINGSLEY, vice-president in charge of sales, will be located at the New York sales office, 101 Park Avenue.

CHARLES ABELES, formerly with the Koppel Industrial Car & Equipment Co., as assistant sales manager in charge of the Eastern district, has joined the sales organization of the Easton Car & Construction Co., Easton, Pa. He is making his headquarters at the New York office of the company.

CHARLES R. HOOK, president, American Rolling Mill Co., Middletown, Ohio, has sailed for Europe on a business trip. While abroad he will confer with the company's British partners in connection with the joint construction of a continuous mill in Australia for John Lysaght, Ltd.

THOMAS R. OWENS, night superintendent of the hot-sheet unit at the Gary works of the Carnegie-Illinois Steel Corp., has been made superintendent of the department, succeeding the late Arthur J. Skemp. Mr. Owens has been associated with the steel industry for more than 25 years. He went to Gary in 1916.

M. E. BASH, formerly with the Crucible Steel Co. of America, has been appointed representative for the metropolitan district of New York and New Jersey, for the sale of tool steels and drill steels handled by A. Milne & Co. and the Edgar Allen Steel Co., Inc.

ROY L. WARREN has been appointed director of purchases for

the Covered Wagon Co., Mt. Clemens, Mich., trailer coach manufacturer. R. G. BENTLEY, formerly in charge of buying, continues as Mr. Warren's assistant. For six years Mr. Warren has been a purchasing agent for Briggs Mfg. Co.

WALTER J. AUBURN, of the Gerard Co., Inc., has been elected for a 3-year period to the board of governors of the Chicago Purchasing Agents' Association. Others elected to the board are H. L. BRUEGGEMAN, Acme Steel Co.,

KENNETH W. MOORE, and M. C. MCGOWAN, Electro-Motive Corp.

GEORGE W. CONNORS, SR., organizer and president of the Connors Steel Co., Birmingham, was named chairman of the board last week and was succeeded as president by his son, GEORGE W. CONNORS, JR., previously vice-president and treasurer. J. C. STALLINGS, secretary, was elected vice-president and manager of sales. M. N. HOKE, assistant secretary and purchasing agent, was elected secretary.

DERMA-SAN

D I S I N F E C T A N T



**With this order
... you halt Oil Dermatitis**

HERE is the surest way to protect your men against the dangers of oil infection. Simply sterilize cutting lubricants with Derma-San. One pint poured into 35 gallons of lubricant quickly kills pus-forming germs before they attack workers. For Derma-San is a powerful disinfectant. It is non-toxic, non-corrosive. It never clogs feed pipes ... never irritates the hands. You'll find Derma-San the most economical, dependable protection you can buy. It will help keep your men at work, increase efficiency, save you money. Order a drum — today.

The HUNTINGTON LABORATORIES Inc.

DENVER HUNTINGTON, INDIANA TORONTO

DERMA-SAN IS EXCELLENT FOR ALL GENERAL PLANT SANITATION

...OBITUARY...

WILLIAM A. DAVIDSON, one of the founders of the Harley-Davidson

Motor Co., Milwaukee, a leading manufacturer of motorcycles for an international market, and its vice-president and works manager since its establishment in 1903, died on April 21, aged 66 years. He was born in Milwaukee and at the age of 15 entered the West Milwaukee locomotive and car shops of the present Milwaukee Road as a machinists' apprentice. He founded

the company with his brother, Walter, president, and another brother, Arthur, secretary, and William S. Harley, treasurer and chief engineer.



WILLIAM C. HEDGCOCK, chief mechanical engineer of the American Steel Foundries, Chicago, died at the Evanston Hospital on April 18, aged 48 years. He spent his early years in railroad shops and entered the engineering department of American Steel Foundries in 1913. He was appointed chief mechanical engineer in 1929.



JOHN A. KING, who served as advertising representative for the three trade journals published by the David Williams Co., *THE IRON AGE*, *Building Age* and the *Metal Worker* from 1902 to 1910, died on April 22, aged 65 years.



Ivo E. THOMAS, founder and president of the Thomas Machine Co., Madison, Wis., died of a heart attack on April 11 while at Green Bay, Wis., on a business trip. Before establishing the firm, Mr. Thomas was district manager at Madison for the Wood Brothers Co., Des Moines, Iowa, manufacturer of engineering equipment.



WILLIAM E. LADEWIG, prominent industrialist and civic leader of Waukesha, Wis., died on April 12, aged 71 years. Until his retirement in 1925 he was president of the Ladewig Mfg. Co., founded by his father in 1870 to manufacture automatic machinery for dairies, breweries, etc.



GEORGE B. INGERSOLL, chief engineer of the Federal Motor Truck Co. until 1932, died of a heart attack April 17 at his home in Dearborn, Mich. Mr. Ingersoll was a graduate of the Detroit College of Law and was a registered mechanical engineer. He was a member of the Society of Automotive Engineers, the Michigan Patent Law Association and the Michigan Bar Association. After he severed his connection with the Federal truck company in 1932 Mr. Ingersoll entered private law practice. He was 50 years old.

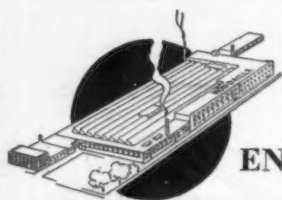


J. E. SIMES, in charge of sulphate sales in the Chicago office of the American Steel & Wire Co., died April 26 at his home in Joliet, Ill.

Precision Versatility

THE production of the famed Houdaille Hydraulic Shock Absorbers is only ONE of a wide range of Houde's achievements in precision engineering and machining.

You may have a single part, or possibly a complete mechanism, which Houde can produce for you with greater precision, greater speed, and at lower cost than your own facilities permit. The way to find out is to send us a blueprint for quotation.



HOUDE
ENGINEERING CORPORATION
BUFFALO, N. Y.

A DIVISION OF HOUDAILLE-HERSHEY CORPORATION

**PERFORATED
METAL**

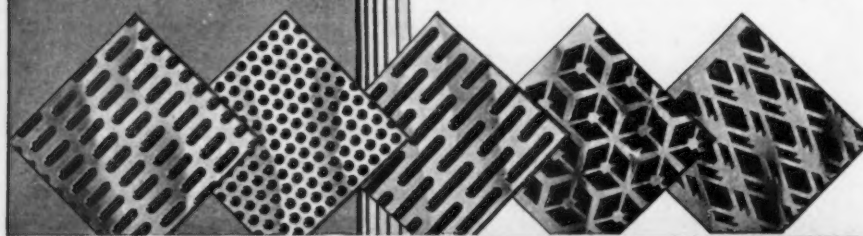
**INDUSTRIAL
and
ORNAMENTAL**

H & K industrial perforations embrace a range of sizes and shapes intended to meet the most exacting requirements of all industries.

H & K ornamental designs include standard and many beautiful and exclusive patterns suitable for architectural grilles, enclosures, ventilators, and all decorative uses.

Send us your specifications.

ANY METAL-ANY PERFORATION



**The
Harrington & King
PERFORATING CO.**

5657 FILLMORE ST., CHICAGO - 114 LIBERTY ST., NEW YORK

Carnegie-Illinois Agrees to Withdraw Support of "Company Union"

WASHINGTON, April 27.—The first of its kind ever made, the Carnegie-Illinois Steel Corp.'s formal agreement made with the National Labor Relations Board Monday to withdraw recognition of the plans of employee representation, is widely considered in Washington as meaning complete disbarment of all so-called company unions, such as exist in the steel and many other industries. In a proceeding before the board, lasting five minutes, William Beye, counsel for the Carnegie-Illinois, presented a statement to the board by which the company agrees to four points, which were accepted by the board. The agreement follows:

"(1) That it will not interfere with, restrain, or coerce its employees in the exercise of their rights to self-organization, to form, join or assist labor organizations, to bargain collectively through representatives of their own choosing, and to engage in concerted activities for the purpose of collective bargaining or other mutual aid or protection,

"(2) That it will not dominate or interfere with the formation or administration of any labor organization of its employees or contribute financial or other support thereto,

"(3) That it will not contribute any support to or participate in and will withdraw all recognition from and completely disestablish its relations with the existing plans of employee representation and any representative elected thereunder, as representative of its employees for the purpose of dealing with respondent concerning grievances, labor disputes, wages, rates of pay, hours of employment or conditions of work,

"(4) That it will post a copy of this statement on the bulletin boards of all its plants and that said notices will remain posted for a period of at least 30 days from the date of posting."

Agreement May Set Precedent

The agreement follows upon the heels of the recent Supreme Court decisions, including that involving the Jones & Laughlin Steel Corp., which validated the National Labor Relations (Wagner) Act. Its provisions parallel those voluntarily made by the International Harvester Co., which also agreed to "disestablish" the so-called company union. The International Harvester agreement, which also

followed the Supreme Court decision, was not formally made with the board.

It is believed that the Carnegie-Illinois agreement will set the pre-

cedent for similar ones where the N.L.R.B. has cases against companies having employee representation plans.

The board complaint against Carnegie-Illinois was announced Dec. 7, 1936, and charged that the United States Steel Corp. and the Carnegie-Illinois Steel Corp. had interfered with self-organization of their employees in the latter's 21 steel plants. The complaint

TRIPLE COMPRESSION SCRAP BALERS



STYLE
100 TC
(100 x 51 x 36)
and other sizes

Also Regular
**Double
Ram Presses**
in all sizes



GALLAND-HENNING MANUFACTURING COMPANY

2724 S. 31st Street Milwaukee, Wisconsin

COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES AND PUMPS

NOTHING ON OUR MINDS BUT—



DUNBAR BROS. CO.
DIVISION OF ASSOCIATED SPRING CORPORATION BRISTOL CONNECTICUT

charged domination and financial support of a plan of employee-representation established among employees of the United States Steel Corp. and its various subsidiaries in violation of the Wagner Act.

The charge was issued upon complaint of the Amalgamated Association of Iron, Steel and Tin Workers, now an affiliate of the Committee on Industrial Organization, which the company under a one-year contract recognized in March, following an intensive drive by the Steel Workers Organizing

Committee, the steel organizing unit of the CIO.

The Carnegie-Illinois Steel Corp. not only denied charges of company domination of the employee representation plan but also attacked the constitutionality of the Wagner Act, and therefore, the jurisdiction of the N.L.R.B. Since then, however, the constitutionality of the Wagner Act has been upheld by the Supreme Court and its decision manifestly gives jurisdiction to the N.L.R.B. in labor disputes in steel and other manufacturing

industries engaged in interstate commerce as broadly interpreted by the Supreme Court. The board held extensive hearings in Washington in the Carnegie-Illinois case, lasting over a period of about two months.

Will Aid Labor Organizations

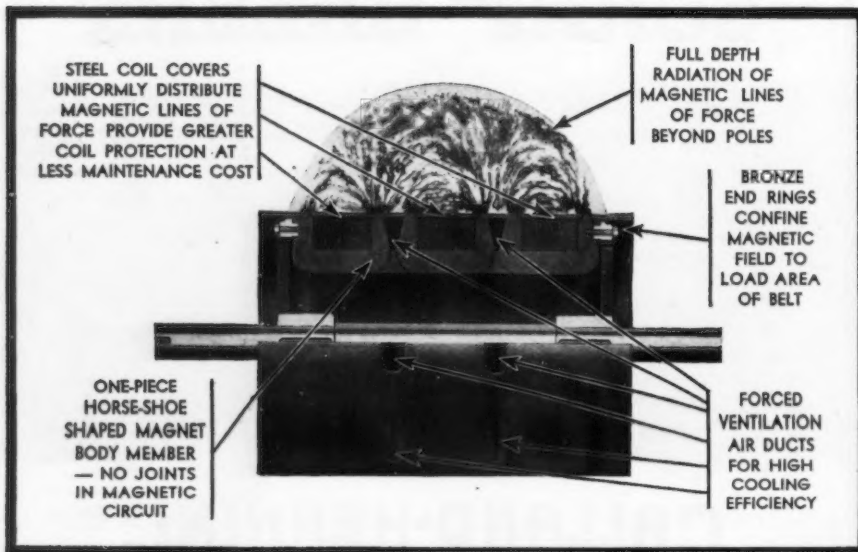
It is expected that the agreement will bring about stimulated efforts on the part of both the CIO and its rival, the American Federation of Labor, further to organize steel and other mass industries, the former seeking to unionize them along vertical lines, while the A.F. of L. will attempt to build up craft unions. It is also likely that as the labor organizations progress in their effort, they will demand that the Labor Board call elections to determine what unit or units represent the majority as being entitled to the sole right of collective bargaining.

Under the Wagner Act, the board is authorized to hold such elections to determine labor organizations which represent the majority, either according to plants or by crafts, that must be recognized as the collective bargaining units. The Carnegie-Illinois agreement, of course, does not prevent the organization of independent labor unions, which would have no affiliation with the CIO, the A.F. of L. or any other labor group. So far, however, efforts of employee representation groups to set up such independent unions have not made any substantial headway, though moves in this direction still are being made and there is a prevailing view that they may be accelerated as a result of the Carnegie-Illinois agreement.

The N.L.R.B. complaint against the Carnegie-Illinois Steel Corp. will be formally withdrawn after 30 days during which copies of the agreement will be posted in the plants of the company.

Secretary of the Interior Ickes has announced award of the contract for manufacture and delivery of frames and tracks for the bulkhead gates at Grand Coulee dam to the Bartlett-Hayward division of the Koppers Co., Baltimore, on its bid of \$26,444.52.

Exports of machinery from the United States in February, 1937, were valued at \$15,838,957, an increase of 20 per cent over the shipments of February, 1936, valued at \$13,181,945.



**STEARNS
PIONEERED
The COOL
MAGNETIC
PULLEY**

Today's accepted principle of forced ventilation in magnetic pulleys was pioneered by Stearns engineers more than fifteen years ago.

That's why Stearns pulleys develop 50% more pull and why this greater magnetic strength has made Stearns pulleys universally recognized as an outstanding product.

Our Bulletin 300, with full description, is yours for the asking.

STEARNS MAGNETIC MANUFACTURING CO.

Formerly Magnetic Mfg. Co.

635 SO. 28th STREET

MILWAUKEE, WIS.

See you at the Foundry Show.

Cummings Drops Bid Collusion Charges

WASHINGTON, April 27.—The report of Attorney General Homer Cummings on so-called collusive steel bids said that the investigation of the department of justice has not produced sufficient evidence to make advisable proceedings in court or under the anti-trust act as it has been construed by the courts.

Foreshadowing a wide opening of the anti-trust laws for amendment, however, the report recommended that a committee be set up to study the anti-trust laws as "to their adequacy, their enforcement and the desirability of amendment, extension and clarification." The committee, the Attorney General recommended, should have power to enlist the aid of consultant groups both within and without the Government, as the studies will naturally cover a wide area, including the relation of anti-monopoly policies to such subjects as patents, taxation, commerce, manufacturing, farming and labor.

The Department of Justice at the direction of the President made its investigation regarding the question of identical sealed bids received by Government agencies seeking to purchase steel products to determine whether court proceedings should be instituted under the anti-trust acts. The Federal Trade Commission made a report to the President June 10, 1936, reaching the conclusion that alleged collusion in maintaining prices accounted for identical bids. This so-called collusion was particularly evidenced, the report maintained, by an agreement of steel producers on June 6, 1935, when following the decision of the Supreme Court invalidating the NRA codes, they adopted a resolution declaring their intention "during the present uncertainty to maintain the standards of fair competition which are described in the steel code."

The investigation originated with complaints made by Secretary of the Interior Ickes over so-called collusive steel bids on PWA projects.

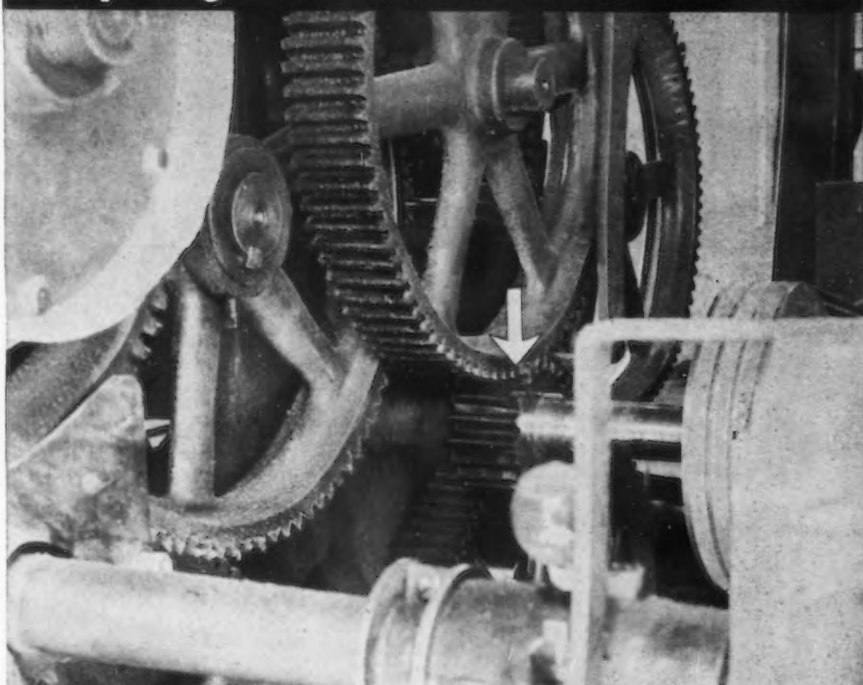
After describing the extensive investigation made by the Department of Justice, the Attorney General reported lack of evidence to convict under criminal or civil proceedings. He said that the administrative and quasi-judicial remedies in the hands of the Federal Trade Commission may be better adopted to the control of the "subject matter of this complaint" than

action by the Department of Justice. The Attorney General said that the identical bids in the steel industry are produced, in part, by the basing-point system of price determination. This system, it was stated, not only affects the manufacturers who utilize it and the consumers who are subject to it, but it also presents economic and social questions due to the fact that communities as well as plants have located and developed with reference to the price structure developed by this system. This utter-

ance was held to have placed the administration for the first time squarely back of anti-basing point legislation, such as is proposed by the Wheeler Bill. Therefore, the view prevails that the bill will be pressed for early passage.

"The machinery of the courts are not geared to the handling of social and economic factors necessarily involved," the Attorney General continued. "It appears therefore that a problem is presented which can be more satisfactorily investigated and dealt with through the

Keep Bugs out of Production Schedules



INSUROK PLASTIC GEARS

are low-cost, positive insurance against costly failures of production equipment. Resisting the action of abrasion, friction, corrosion; impervious to most acids, solvents, reagents, oils and other liquids; tough, durable, long-wearing INSUROK gears outwear metal many times over; maintain uninterrupted production schedules; reduce power consumption and cut manufacturing costs. Send for complete details and copy of INSUROK Handbook.

The RICHARDSON COMPANY

Melrose Park, (Chicago) Ill. Founded 1858 Lockland, (Cincinnati) Ohio
New Brunswick, N. J. Indianapolis, Ind.
Detroit Office: 4-252 G. M. Building, Phone Madison 9386
New York Office: 75 West Street, Phone Whitehall 4-4487

more flexible remedies of the Federal Trade Commission."

Putting the matter back in the hands of the commission is held to indicate that the FTC, long opposed to the basing-point system in steel and other industries, will be a prime mover in urging enactment of the Wheeler Bill.

The type of practices complained of, the Attorney General stated, is widespread throughout many of the basic industries of the country. The difficulty in correcting this

situation was said to raise the whole question as to the adequacy of the present anti-trust laws for the solution of the monopoly problem as it now exists. The Attorney General expressed the opinion that the time has come for Federal Government to undertake "a restatement of the (anti-trust) law designed to prevent monopoly and unfair competition. "It was also stated that the laws dealing with phases of the industrial question have been subjected to court interpretations which have limited their

application, modified their meaning and imposed upon the government impossible burdens of proof.

"This department has labored with inadequate means to enforce laws that do not provide sufficient legal weapons to make enforcement effective," Mr. Cummings stated. "In the face of a present tendency to increase prices and a necessity for a corresponding increase in the vigilance of the Department, the question is forcibly presented as to whether the country can afford to leave the enforcement of a vital economic policy so poorly sustained. The present machinery of enforcement through the Federal Trade Commission also should be made more adequate and effective, and the devitalizing effect of some of the court interpretations upon its powers should be overcome by legislation."

Aluminum Company Answers U.S. Suit

THE Aluminum Co. of America has issued the following statement regarding the Government suit directed against it for alleged monopolistic practices:

"Aluminum Co. of America is at a loss to understand why it has been singled out for further investigation by the Department of Justice in view of thorough probes in the past which had, in its belief, cleared the company of any charges of monopolistic practices.

"None of these investigations, many of which were by the Department of Justice, have ever shown any wrongdoing by the company. One investigation by the Federal Trade Commission, which lasted for approximately seven years and thoroughly scrutinized every phase of the company's activities including alleged monopoly, resulted in a decision clearing the company of all charges.

"Although it happens to be the only producer of pig aluminum in the United States, the company cites Federal and other statistics to prove that it sells the hundreds of manufacturers of aluminum products only about one-third of their requirements in aluminum ingot, their purchases from the scrap and foreign markets accounting for the major portion of their supply.

"Recent announcements by company officials indicate that Aluminum Co. of America has thrown its influence as a leader in the field against price advances in the metal in contrast to the general price increase of other materials and in spite of substantial advances in wages and other costs of production."

PERKINS MAN COOLER



Trade Mark
Reg. U. S. Pat. Off.

PERKINS MAN COOLERS, recognized as the most efficient appliance for bringing comfort to workers in hot places, are proving a vital factor in production. They are keeping men comfortably at work in the hottest places, reducing labor turnover, speeding production. Made in **OSCILLATING** and **STATIONARY** types (both portable).

B. F. PERKINS & SON, INC. HOLYOKE, MASS.

United States Steel Announces Quarterly Earnings of \$45,260,205

THE directors of the United States Steel Corp. on Tuesday announced earnings for the first quarter of \$45,260,205, from which was paid the regular quarterly dividend on the preferred stock of \$1.75, and \$4 on the preferred arrearages. Net income available for dividends after deduction of all charges, expenses and taxes, except the Federal surtax on undistributed profits which cannot be figured until the end of the year, amounted to \$28,561,533. Surplus for the quarter after dividend payments was \$7,845,370.

Left unpaid are preferred arrearages to the amount of \$18,914,758, or \$5.25 a share. The corporation earned \$2.55 a common share after deducting from net income the \$6,304,919 necessary for payment of the regular quarterly dividend.

In a statement by Myron C. Taylor, chairman of the board, it was revealed that operations for the quarter averaged 82.6 per cent of capacity, the rate of production to capacity being in increasing proportions as the quarter progressed.

"Shipments during the quarter were 3,698,041 tons, or 82.8 per cent of capacity, compared with 2,144,570 tons, or 45.5 per cent of capacity in the corresponding quarter of 1936. Shipments during the quarter were fairly well diversified as to classification of products, although materials for capital goods consumption continued somewhat below those for consumer goods.

"The expenditures made during the first quarter of 1937 for additions and betterments and for payment of maturing bonds and other capital obligations of subsidiary companies, totaled approximately \$17,400,000."

On April 1, Mr. Taylor said, unexpended balances on authorized appropriations for rehabilitation of plants, replacement of worn out and obsolete units, etc., totaled about \$160,000,000.

Net working assets of the corporation, exclusive of dividends declared and unpaid, were at the respective dates named below as follows:

Dec. 31, 1935.....	\$389,123,253
Dec. 31, 1936.....	391,330,566
March 31, 1937...	411,081,436

Employment and payroll statistics for the quarter disclosed a 24.2 per cent increase in the number of employees and a 50.8 per cent increase in the amount of wages paid over the first quarter last year.

Employees now number 246,321, compared with 198,269 in the first quarter of 1936, while wages totaled \$104,456,482 this year compared with \$69,259,055 for the same period last year.

Westinghouse Electric & Mfg. Co., East Pittsburgh, reports net income for the March quarter of \$5,341,512, equal to \$2 a

share on combined shares of preferred and common stock, compared with \$3,732,454, or \$1.40 a share, in the first quarter of 1936. Net income was the best for any quarter since 1929. A record was established the first three months of this year with bookings totaling \$74,242,584. Unfilled orders on March 31 amounted to \$73,735,326, largest backlog since 1923.

General Electric Co. reports first-quarter net profit at \$11,626,408, compared with \$7,086,830 in same period a year ago, earnings being equivalent to 40c. a common share and 25c. respectively. Sales billed in the first quarter totaled \$73,412,420, against \$51,423,071 in corresponding three months of 1936.

HUGE



**TOUGH · STRONG
LONG LIVED**

WHEN the Phosphor Bronze Smelting Co. recently decided to put in a new Three-High Mill for rolling large Phosphor Bronze Shafts, they did not hesitate as to the make of Speed Reducing Unit they desired . . . they knew that strength, durability and reliability, plus continuous, smooth, accurate operation were essential. They also knew that a Speed Reducer in such service just "had to take it"—day in and day out. . . .

The answer was a Philadelphia Double Reduction Herringbone Reducer with Sykes Continuous Tooth Herringbone Gears. You, too, can follow the example of Phosphor Bronze Smelting Company (and hundreds of others) by putting your Speed Reduction problems up to us.

PHILADELPHIA

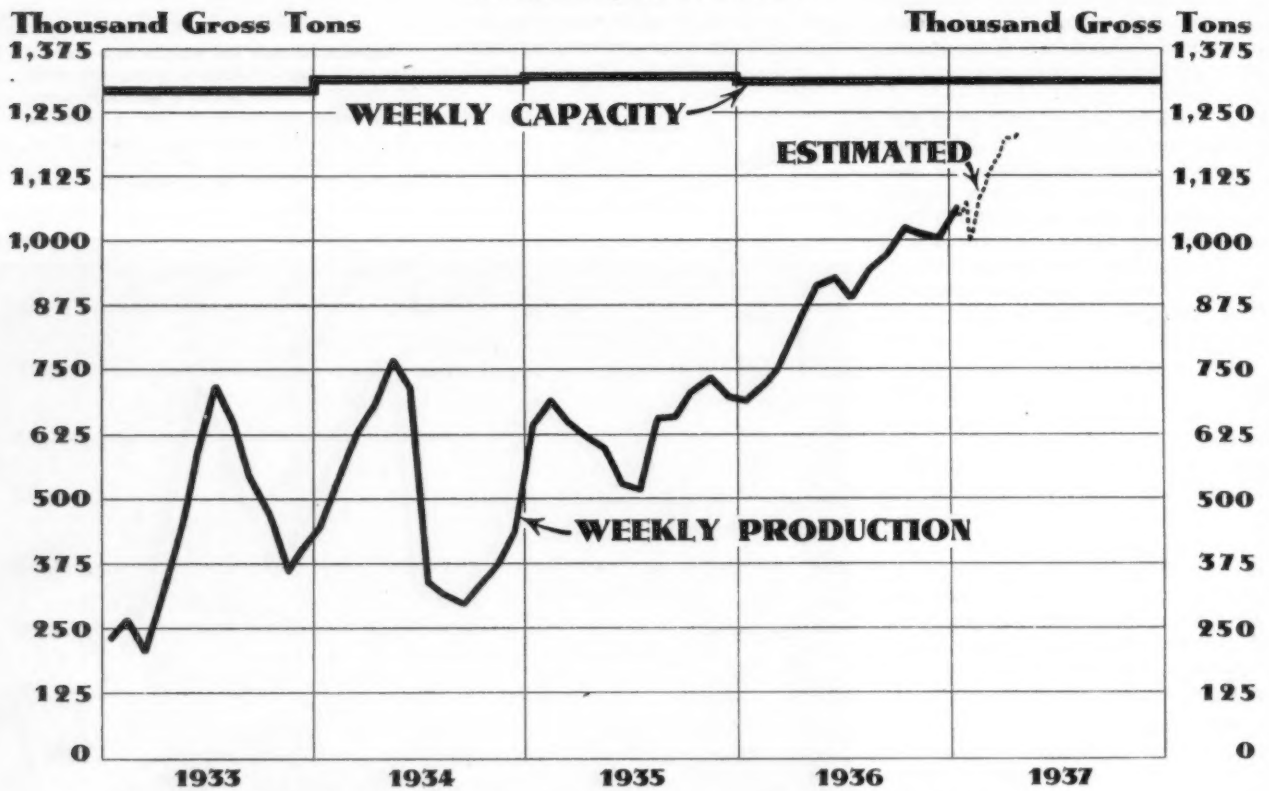


Speed Reducers

Philadelphia Gear Works
Industrial Gears and Speed Reducers
Erie Avenue and "G" St.
PHILADELPHIA

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week
Pittsburgh	92.0	94.0
Chicago	86.0	86.0
Valleys	90.0	90.0
Philadelphia	67.5	67.5
Cleveland	86.0	87.0
Buffalo	92.0	92.0
Wheeling	75.0	99.0
Southern	75.0	75.0
Ohio River	90.0	90.0
Western	95.0	95.0
St. Louis	90.0	90.0
Detroit	100.0	100.0
Eastern	98.0	98.0
Aggregate	90.5	92.0

Weekly Booking of Construction Steel

	Week Ended				Year to Date	
	April 27, 1937	April 20, 1937	Mar. 30, 1937	April 28, 1936	1937	1936
Fabricated structural steel awards.....	12,550	14,200	35,550	14,125	429,295	347,315
Fabricated plate awards.....	2,495	2,160	12,270	8,675	55,685	109,870
Steel sheet piling awards.....	180	450	275	0	15,560	15,405
Reinforcing bar awards.....	5,900	4,045	1,685	2,850	64,285	136,755
Total Lettings of Construction Steel....	21,125	20,855	49,780	25,650	564,825	609,345

...SUMMARY OF THE WEEK...

... Ingot production down slightly as flood menaces Pittsburgh and Wheeling.

• • •

... Price stabilization has brought quieter market, but business is in fair volume.

• • •

... Leveling off process likely, but future looks bright to steel companies.

THE principal incentive for forward buying having been removed by the announcements of a continuation of present steel prices through the third quarter, an easier situation prevails in the steel market. However, incoming business reported by some companies is not greatly below shipments, comparing favorably with the February volume, but less than that of March.

Deliveries on a few products have shortened, chiefly because some buyers who had entered orders for shipment during second quarter to escape a possible price advance July 1 have asked the mills to defer processing of some of their tonnage to the third quarter. If this tendency spreads, a leveling off process in production may be expected, though it is doubted that any marked downtrend will occur owing to present heavy backlogs and pending business of a definite character.

Some steel companies have booked a large volume of business for the third quarter, most of this having been taken prior to the announcement of prices. Others that had refrained so far as possible from booking beyond the second quarter are now actively soliciting business after a period of relaxed selling effort induced by their sold-up condition for this quarter.

Practically all products except pig iron have been covered by the past week's price announcements. Although pig iron is so scarce that one or two integrated steel companies are trying to find an outside source of supply to augment their own production, there is less pressure for shipments from contract customers in the foundry industry because fear of an immediate price advance has been removed. Some Eastern merchant furnaces were contemplating an early advance, but it now appears that action may be deferred until about June 1, when books will be opened for the third quarter. Tightness in the coke supply also con-

tinues, and Connellsville foundry coke is 25c. a ton higher at \$5.25.

In contrast with strength in pig iron and coke, scrap has grown weaker, with declines of \$1.50 at Pittsburgh and 75c. at Chicago in the heavy melting grade, bringing THE IRON AGE scrap composite down to \$20, the third consecutive weekly decline.

FLOOD waters at Pittsburgh and Wheeling have caused the shutting down of blast furnaces and steel-making furnaces. At Pittsburgh one steel plant stopped operation Monday night, but resumed almost in full on Tuesday when the waters had receded. In the Wheeling district, which suffered most severely in the January flood, an open-hearth and a bessemer steel plant were shut down Tuesday as the crest of the flood approached that point. The Pittsburgh rate declined only two points to 92 per cent, but the Wheeling rate must be estimated tentatively for this week at not more than 75 per cent, against 99 per cent last week, bringing the rate for the country down to 90½ per cent. When the estimate of 92.3 per cent by the American Iron and Steel Institute was issued on Monday the flood danger had not appeared. Aside from flood consequences, which may be temporary, no marked change from a 90 to 92 per cent operation for the industry is looked for during May, at least.

THE change from the extremely active buying of last month has given steel companies a calmer period in which to appraise prospects for the coming months. Granted that speculative features of the present boom have subsided, there is no disposition to view the outlook for the remainder of the year with anything but optimism. Even though the high production of the first several months may not be equaled in the last half, there appears to be an expectation of well-sustained demand. The automobile companies probably will make additional large purchases soon to complete their runs on 1937 models, and there will be a quick turnover to 1938 models with a minimum of die changes. With motor car output approaching the best records of 1929, retail sales are more than keeping pace, indicating that high production may continue for some time. Railroad equipment sales are adding to car builders' substantial bookings, and considerable additional business is in sight. Tractors and farm implement manufacturers will maintain large output for some time. Only in the construction field, particularly the large investment type of building, is the outlook unpromising, though small jobs are making fair headway. One or two pipe lines in the Middle West are at the point of being awarded. Tin plate production continues at 100 per cent, with no letdown in sight before October.



...PITTSBURGH...

... Flood waters cause temporary curtailment of steel production.

o o o

... Pittsburgh and Wheeling ingot rates drop to 92 per cent.

o o o

... Business volume not far behind shipments; deliveries a little easier.

PITTSBURGH, April 27.—For the second time in the past four months flood waters have forced some steel producers to shut down steel-making capacity as a precautionary measure. Early today the rivers rose 10 ft. above flood stage and are now subsiding at a slow rate. Jones & Laughlin Steel Corp. shut down 19 open-hearth furnaces and four blast furnaces last night, but 14 of the open hearths were started this morning and the remainder will be in operation within the next few days. Blast furnaces will also resume operations within the next day or so.

As the crest of the flood approached Wheeling, the Wheeling Steel Corp. took off all of its open-hearth furnaces, which probably will be shut down for two or three days. Its bessemer plant at Benwood, W. Va., also is idle. The Portsmouth plant of Wheeling apparently will be unaffected, though it received the brunt of the January flood. The Laughlin works of Carnegie-Illinois at Martins Ferry and the Mingo plant of the same company at Mingo Junction will also be idle for about two days. It was expected that the flood would recede quickly and that only temporary cessation of work would be necessary.

Steel ingot operations at the leading producer's plants were unaffected. Curtailment due to the flood and to slightly lowered scheduled operations at one plant has dropped ingot output in the Pittsburgh district two points to 92 per cent. Operations in the Wheeling district have temporarily declined to 75 per cent owing to the shutting down of the plants above mentioned.

Second quarter prices have been reaffirmed for third quarter ship-

ment on practically all major steel items. Pipe makers are not expected to make an announcement on third quarter prices for some time, but no material changes are expected. There is little doubt, however, that the reaffirmation of prices has brought a halt to the frenzied attempts to get on order books.

Raw material markets are mixed, with the pig iron and coke situation extremely tight, but No. 1 heavy melting scrap has declined \$1.50 a ton, the fourth consecutive weekly decline.

Pig Iron

No definite information is available regarding third quarter quotations. Supplies are now inadequate to meet current actual and potential demand. There is a serious shortage of steel-making iron which, if it persists, may force some integrated mills to seek supplies in the open market. Furthermore, advance demand has been felt in this district, some sales having been made recently at \$1 or more above current prices. Even though second quarter prices should be reaffirmed for the third quarter, some producers, in order to protect themselves and still supply their regular customers, may request premium prices on spot sales.

Semi-Finished Steel

In view of the leading producer's announcement last week that the prices on major steel items will be reaffirmed for third quarter delivery, no change on semi-finished quotations will materialize. Bookings in the past week are fully as good as the previous period and in view of the tight situation, there will be little leveling off in demand within the next month or so. While

orders are still about 35 per cent below those placed during the same period in March, incoming business continues ahead of February.

Bolts, Nuts and Rivets

In many cases producers are under exceptional pressure from customers for better delivery service and production remains at virtual capacity. New orders are about on a par with a week ago but are still substantially below the volume placed last month. No formal announcements have been made regarding third quarter prices, but there is a possibility that some upward adjustments may be made. Third quarter price information is not expected for several weeks.

Bars

Second quarter quotations have been reaffirmed for third quarter shipments and it is expected that there will be less of a rush on the part of customers to get on the order books. Since the price announcement last week there has been no noticeable drop in the rate of incoming business, which, during the past week, has been equally as good as in the previous week. Despite the fact that current orders are in lighter volume than a month ago and that the trade has given assurance that no increase in price will materialize, there continues to be tremendous pressure from a majority of customers for earlier deliveries. Automobile buying has slackened some, but final clean-up orders for 1937 models are expected in the near future.

Cold-Finished Bars

Second quarter prices have been reaffirmed for third quarter delivery. New business, if anything, is in less volume than a week ago but signs of better buying on the part of automobile producers are discernible. Some auto makers are placing their final orders for 1937 models. Backlogs are still running about six to eight weeks, with production being maintained at virtual capacity.

Reinforcing Bars

Second quarter quotations will cover sales for third quarter shipment. Inquiries in the past week were in fair volume, a large percentage of which called for rail steel reinforcing bars. A Chicago department store will be inquiring soon for 6000 tons of rail steel concrete bars, to be used in the construction of three store buildings and a warehouse. Awards this week are fairly light, but there are a considerable number of projects to be let soon.

Steel Sheet Piling

This market continues quite dull

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Apr. 27, 1937	Apr. 20, 1937	Mar. 30, 1937	Apr. 28, 1936
Rails, heavy, at mill.....	\$42.50	\$42.50	\$42.50	\$36.37 1/2
Light rails, Pittsburgh.....	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh..	37.00	37.00	37.00	28.00
Sheet bars, Pittsburgh.....	37.00	37.00	37.00	28.00
Slabs, Pittsburgh.....	37.00	37.00	37.00	28.00
Forging billets, Pittsburgh...	43.00	43.00	43.00	35.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	2.45	2.45	2.45	1.85
Bars, Chicago.....	2.50	2.50	2.50	1.90
Bars, Cleveland.....	2.50	2.50	2.50	1.90
Bars, New York.....	2.78	2.78	2.78	2.20
Plates, Pittsburgh.....	2.25	2.25	2.25	1.80
Plates, Chicago.....	2.30	2.30	2.30	1.85
Plates, New York.....	2.53	2.53	2.53	2.09
Structural shapes, Pittsburgh	2.25	2.25	2.25	1.80
Structural shapes, Chicago...	2.30	2.30	2.30	1.85
Structural shapes, New York	2.5025	2.5025	2.5025	2.06 1/4
Cold-finished bars, Pittsburgh	2.90	2.90	2.90	2.10
Hot-rolled strips, Pittsburgh.	2.40	2.40	2.40	1.85
Cold-rolled strips, Pittsburgh	3.20	3.20	3.20	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	3.15	3.15	3.15	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	3.25	3.25	3.25	2.50
Sheets, galv., No. 24, P'gh...	3.80	3.80	3.80	3.10
Sheets, galv., No. 24, Gary...	3.90	3.90	3.90	3.20
Hot-rolled sheets, No. 10, Pittsburgh.....	2.40	2.40	2.40	1.85
Hot-rolled sheets, No. 10, Gary.....	2.50	2.50	2.50	1.95
Cold-rolled sheets, No. 20, Pittsburgh.....	3.55	3.55	3.55	2.95
Cold-rolled sheets, No. 20, Gary.....	3.65	3.65	3.65	3.05
Wire nails, Pittsburgh.....	2.75	2.75	2.75	2.10
Wire nails, Ch'go dist. mill...	2.80	2.80	2.80	2.15
Plain wire, Pittsburgh.....	2.90	2.90	2.90	2.40
Plain wire, Ch'go dist. mill...	2.95	2.95	2.95	2.45
Barbed wire, galv., P'gh....	3.40	3.40	3.40	2.60
Barbed wire, galv., Chicago dist. mill.....	3.45	3.45	3.45	2.65
Tin plate, 100-lb. box, P'gh...	\$5.35	\$5.35	\$4.85	\$5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	Apr. 27, 1937	Apr. 20, 1937	Mar. 30, 1937	Apr. 28, 1936
No. 2 fdy., Philadelphia.....	\$25.76	\$25.76	\$25.76	\$21.3132
No. 2, Valley furnace.....	24.00	24.00	24.00	19.50
No. 2, Southern Cn'tl.....	23.69	23.69	23.69	20.2007
No. 2, Birmingham†.....	20.38	20.38	20.38	15.50
No. 2, foundry, Chicago*....	24.00	24.00	24.00	19.50
Basic, del'd eastern Pa.....	25.26	25.26	25.26	20.8132
Basic, Valley furnace.....	23.50	23.50	23.50	19.00
Malleable, Chicago*.....	24.00	24.00	24.00	19.50
Malleable, Valley.....	24.00	24.00	24.00	19.50
L. S. charcoal, Chicago.....	30.04	30.04	30.04	25.2528
Ferromanganese, seab'd, car- lots.....	95.00	95.00	95.00	75.00

†This quotation is subject to a deduction of 38c. a ton on phosphorus content of 70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh...	\$20.75	\$22.25	\$23.75	\$15.75
Heavy melting steel, Phila...	19.75	19.75	20.25	13.50
Heavy melting steel, Ch'go...	19.50	20.25	21.75	14.37 1/2
Carwheels, Chicago.....	20.75	21.75	21.25	14.00
Carwheels, Philadelphia....	21.25	21.25	20.00	14.50
No. 1 cast, Pittsburgh.....	20.25	20.25	20.25	15.25
No. 1 cast, Philadelphia....	22.00	22.25	22.25	14.00
No. 1 cast, Ch'go (net ton)...	16.75	16.75	17.00	12.50
No. 1 RR. wrot., Phila.....	19.75	19.75	20.00	15.00
No. 1 RR. wrot., Ch'go (net)	16.75	18.00	19.00	12.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$4.60	\$4.60	\$4.25	\$3.65
Foundry coke, prompt.....	5.25	5.00	4.50	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn....	14.50	14.50	16.25	9.50
Lake copper, New York.....	14.62 1/2	14.62 1/2	16.37 1/2	9.62 1/2
Tin (Straits), New York.....	56.75	56.37 1/2	65.25	46.80
Zinc, East St. Louis.....	6.75	7.00	7.50	4.90
Zinc, New York.....	7.10	7.35	7.85	5.27 1/2
Lead, St. Louis.....	5.85	5.85	6.80	4.45
Lead, New York.....	6.00	6.00	6.95	4.60
Antimony (Asiatic), N. Y....	17.00	17.00	17.00	13.50

The Iron Age Composite Prices

Finished Steel

April 27, 1937
One week ago
One month ago
One year ago

2.605c. a Lb.
2.605c.
2.605c.
2.097c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	High	Low
1937.....	2.605c., Mar. 9	2.330c., Mar. 2
1936.....	2.330c., Dec. 28	2.084c., Mar. 10
1935.....	2.130c., Oct. 1	2.124c., Jan. 8
1934.....	2.199c., April 24	2.008c., Jan. 2
1933.....	2.015c., Oct. 3	1.867c., April 18
1932.....	1.977c., Oct. 4	1.926c., Feb. 2
1931.....	2.037c., Jan. 13	1.945c., Dec. 29
1930.....	2.273c., Jan. 7	2.018c., Dec. 9
1929.....	2.317c., April 2	2.273c., Oct. 29
1928.....	2.286c., Dec. 11	2.217c., July 17
1927.....	2.402c., Jan. 4	2.212c., Nov. 1

Pig Iron

\$23.25 a Gross Ton
23.25
23.25
18.84

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
1937.....	\$23.25, Mar. 9	\$20.25, Feb. 16
1936.....	19.73, Nov. 24	18.73, Aug. 11
1935.....	18.84, Nov. 5	17.83, May 14
1934.....	17.90, May 1	16.90, Jan. 27
1933.....	16.90, Dec. 5	13.56, Jan. 3
1932.....	14.31, Jan. 5	13.56, Dec. 6
1931.....	15.90, Jan. 6	14.79, Dec. 15
1930.....	18.21, Jan. 7	15.90, Dec. 16
1929.....	18.71, May 14	18.21, Dec. 17
1928.....	18.59, Nov. 27	17.04, July 24
1927.....	19.71, Jan. 4	17.54, Nov. 1

Steel Scrap

\$20.00 a Gross Ton
20.75
21.92
14.54

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low
1937.....	\$21.92, Mar. 30	\$17.92, Jan. 4
1936.....	17.75, Dec. 21	12.67, June 9
1935.....	13.42, Dec. 10	10.33, April 23
1934.....	13.00, Mar. 13	9.50, Sept. 25
1933.....	12.25, Aug. 8	6.75, Jan. 3
1932.....	8.50, Jan. 12	6.43, July 5
1931.....	11.33, Jan. 6	8.50, Dec. 29
1930.....	15.00, Feb. 18	11.25, Dec. 9
1929.....	17.58, Jan. 29	14.08, Dec. 3
1928.....	16.50, Dec. 31	13.08, July 2
1927.....	15.25, Jan. 11	13.08, Nov. 22

so far as awards are concerned. Outstanding inquiry is for 9000 tons for a PWA project at Keystone, Neb. Bids will be taken May 21. No detailed announcements have been made as yet, but it is expected that second quarter quotations will be reaffirmed for third quarter delivery.

Plates and Shapes

Second quarter prices on plates and shapes have been reaffirmed for the third quarter. This action is expected by some to benefit those contemplating large construction projects during the next several months, in that they will be able to estimate costs more accurately. Meanwhile, specifications for both plates and shapes have increased within the past week and total at least 30 per cent ahead of the same period in March. The activity in plates, owing to tank and pipe work, is more brisk than structural bookings. Awards and inquiries are about as numerous as a week ago. The outstanding inquiry is for 3900 tons of plates and shapes to be used in the construction of tunnels and shafts for the Midtown-Hudson (Lincoln) Tunnel in New York. River Terminals Corp., New Orleans, has taken bids on five to six steel barges requiring approximately 1300 tons.

Sheets

Second quarter prices on sheets have been generally reaffirmed for third quarter shipments. Bookings in the past week are about equal to the previous period and are still ahead of shipments, with the result that no change in backlogs on most items has materialized. Cold-rolled sheet deliveries continue a little easier, although there are indications that final buys for 1937 automobiles will make their appearance within the coming month. Aggregate demand is miscellaneous in nature and, although price announcements have taken away the uncertainty regarding the third quarter quotations, no appreciable falling off in orders is expected in view of the present delivery situation.

Tubular Products

No information concerning third quarter prices on tubular products has been forthcoming, nor is any expected in the near future. The last price information was given out on the basis that it would exist until further announcement. Meanwhile, no material changes in price quotations are expected on third quarter shipments. Orders are in fair volume with oil-country specifications holding steady. Great Lakes Pipe Line Co., Kansas City, is going

ahead on the contemplated 6 and 8-in. pipe lines in the Middle West. It is understood one line will run from Barnesdale, Okla., to Kansas City for gasoline transmission, paralleling an existing pipe line between these two places. A pipe line loop from Des Moines, Iowa, north to Minneapolis and south to St. Louis, and another pipe line replacing an existing line from Osceola, Iowa to Omaha, Neb. are also contemplated.

Strip

A large producer has reaffirmed second quarter prices for third quarter shipments on hot and cold rolled strip. Deliveries have not improved in the past week as new orders have totaled slightly better than a week ago. Main support for incoming business are sources other than automobile makers, who are taking comparatively little steel at this time. Renewed activity on the part of motor makers, however, is expected in the near future.

Railroad Buying

Opinion is growing that a considerable number of railroad cars will be ordered before the end of this year in view of the heavy traffic expected this fall. It is also expected that activity at railroad repair shops will continue. Atlantic Coast Line has awarded 730 cars as follows: 400 50-ton box, 100 50-ton auto without loaders, 100 50-ton auto with loaders, to Mount Vernon Car Mfg. Co., and 100 70-ton phosphate, 15 passenger and 15 express cars to Bethlehem Steel Corp.

Wire Products

Second quarter prices on wire products have been generally reaffirmed for third quarter shipment. The suspicion exists, however, in some quarters that certain merchant wire items such as wire nails and barbed wire may be advanced within the next month or two. Specifications for manufacturers' wire are in excellent volume and mills are being pressed for better delivery. Merchant wire items are being ordered in fair volume with consumption at a fairly high level.

Coal and Coke

Coal production continues at a level considerably below a month ago as most consumers have large stocks on hand. Beehive furnace coke on the other hand remains tight, with little material available for spot inquiries. Beehive furnace coke is moving rather slowly owing to accumulations built up last month. The Connellsville beehive foundry coke price, however, has advanced 25c., based on recent sales. Connellsville coking coal is

being diverted to makers of furnace coke because of the better prices obtained.

Tin Plate

Tin plate operations continue at 100 per cent, with all producers having comfortable backlogs. Pressure is being exerted from some quarters for more prompt shipment and there is increasing evidence of an upward surge in tin plate consumption. Both beer can and oil can sales are running ahead of the same period a year ago. Substantiation of improvement in consumption is found in the expansion programs of several can makers.



... *Foreign demand for pig iron continues.*

... *Domestic castings orders are slackening.*

BOSTON, April 27.—Pig iron sales are not important. Foundries are active, but new bookings for castings are not coming in as rapidly as they were two months ago. A Pittsburgh district steel mill has been sounding out the market for iron without success, its requirements being 4000 tons a month. Two 1000-ton lots of iron were sold the past week to a European country at a price well above the domestic market. A further shipment of iron to Japan on an old order is scheduled to leave here shortly. It will cost \$13 a ton freight to Japan. Recent pig iron exports include 1134 tons for England and 500 tons for Greece.

Massachusetts is out for bids on five new bridges, and has four others in the process of estimating. New Hampshire is asking bids on two bridges, and Maine on one large and several small ones. Thus the fabricating trade is busier than it has been in some time. Demand for reinforcing steel bars is somewhat better, but current sales are still very largely in small lots.

CIO has become a disturbing factor in the New England coke, machine tool building and chuck-making industries.

General Electric Co. through S. Stewart Clark, works manager at Bridgeport, Conn., has announced an extensive power house modernization program to cost more than \$1,000,000.



CHICAGO

... Third quarter prices, without change, announced by all producers.

o o o

... Ingot output at 86 per cent, where it may stay for two or three months.

o o o

... Demand for plates unusually heavy; deliveries three or four months.

CHICAGO, April 27.—The idea of announcing third quarter prices, extending present quotations, has taken universal hold of producers in this territory. However, some of them have a few mental reservations and look toward at least a few adjustments where they know current prices to be out of line with costs.

Basically, consumers are well satisfied for they have had one of their worries removed. They reflect this ease of mind by their waning interest in forward buying, which is welcomed by producers who want a breathing spell. Books are heavy and specifications for finished steel leave nothing to be desired. Ingot production remains at 86 per cent of capacity, where it can easily stay for two to three months. A feature of the market is the heavy buying by farm implement manufacturers and tractor builders, who report excellent market conditions, which promise to remain for some time to come.

Pig Iron

The only merchant stack not now lighted is undergoing relining and the work has progressed to the point where the operators expect to blow it in near the end of May. Prices are firm in a market which has settled down to a basis of spot sales. April shipments are excellent considering that near normal market conditions prevail.

Coke

Prices are steady, and in all probability present quotations will

be carried forward for May deliveries. Production is at capacity and foundries are taking the full make which is being used as received.

Wire Products

Present prices are reaffirmed for third quarter, thereby setting at ease the minds of consumers, who for the first time in months need not worry about this phase of their costs. There is less incentive to speculate and sales are falling lower. Specifications in manufacturers' lines remain very heavy, but mills are suffering in the matter of country shipments because of overbuying by jobbers, who in most instances report satisfactory movement from their ample stocks. Mills still do not feel the effects of better residential construction, though they look hopefully to late spring and summer as being periods when nails will move faster.

Sheets

Statements of prices for third quarter mean little in the matter of adding tonnages to books because of heavy advance orders. Tin plate is sold out to Oct. 1. Cold rolled sheets offer the best delivery possibilities, the range being from four to six weeks. Galvanized and hot rolled products average better than three months. All mills in this area are producing at capacity and current specifications are heavy.

Rails

Raw steel has been and is an important factor in the matter of rail deliveries, which are far behind the

schedules desired by the railroads. One local unit will not complete present orders until the end of summer, while the other producer may need new tonnages some time in July. A small inquiry for rails and accessories comes from the Colorado & Wyoming Railroad.

Plates

This commodity has performed an about-face which is remarkable. From its place at the bottom of the demand list it has moved upward at a fast clip, spurred by railroad equipment, until now deliveries range from three to four months. New demand is shaping in the form of more railroad buying, better business from oil producers and distributors, a healthy demand for cranes, some industrial expansion, promised spring bridge work and some Government dam work. A pipe line at Soda Springs, Idaho, will take 800 tons.

Cast Iron Pipe

Orders for small industrial extensions are more numerous and they are keeping alive what would otherwise be a very dead market. PWA orders are few but so long as the Government hangs the possibility of aid before municipalities local governments will not attempt to finance projects; hence this phase of the cast iron pipe market is dull. There is little of consequence on engineers' boards and they are rather gloomy as to the outlook. The small size of orders means prompt delivery and no accumulations on foundry books from the Mid-Western territory.

Reinforcing Bars

Both awards and fresh inquiries are slow for this time of year. City of Chicago is awarding a number of small school jobs which will all go to one fabricator. Illinois road work which should be active is coming out in very small lots. On the other hand, both Wisconsin and Indiana have large programs which will contribute liberally to shop books. Some plans are again on architects' boards for new apartment houses but it is doubtful if capital can be enticed into that form of venture, and the outlook for construction awards is not good.

Structural Shapes

The outstanding award in this area is the 1400-ton job placed with the American Bridge Co. by Central Steel & Wire Co., Chicago. Bridge work is again making its appearance in many Western states and reports indicate that this phase of the market will grow as spring advances. A turf club at Hollywood, Cal., calls for 1200 tons. The market for the investment type of

structure remains very slow. Material prices are factors, but labor unrest and the uncertainty of labor rates of pay are the largest stumbling blocks in the way of revival in this field.

Bars

Deliveries range from two to two and one-half months and new buying is not far from holding backlogs steady in the face of liberal specifications. Of particular note is the abandon with which farm implement and tractor builders are making new and large commitments. They are running at top speed and all signs point to high production well into the summer months. An exodus of steel sales experts to Detroit reflects the interest automobile builders are showing in steel needs.



... April pig iron shipments unusually heavy.

o o o

... Tractor companies engaged until October.

ST. LOUIS, April 27.—Shipments of pig iron to melters in the St. Louis area during April are expected to be equal to those of March, which was the best month of the year. New business, however, is small, as melters previously had committed themselves for their requirements for the second quarter. Reports from the agricultural implement sector are that operations are continuing at the peak rate. Tractor manufacturers are especially busy, their order files being sufficient to enable them to operate at full capacity until Oct. 1, if no new business is received. Operations in stove foundries in the Belleville district have been cut to five days a week, because of the demands of labor not to work six. Jobbing foundries in St. Louis catering to the electrical industry are feeling the effects of strikes.

Ingot operations in the district continue at 90 per cent of capacity.

While there has been no appreciable effect yet, it is expected that the announcement of present prices on finished steel for the third quarter will cause a slowing down of orders for the remainder of the second quarter. The business in the past week has been large, although not so heavy as several weeks ago.



... Steel output continues at near-capacity.

o o o

... Construction demand is lower.

BUFFALO, April 27.—Open-hearth operations this week are: Bethlehem's Lackawanna plant, 28 or 29 of 30; Republic Steel Corp., eight of nine, and Wickwire-Spencer Steel Co., three of four.

P. Tomasetti Contracting Co., Brooklyn, is low bidder on five sections of Buffalo sewer construction just advertised. About 300 tons of reinforcing bars are involved. The same company is low bidder on the pumping station to be built at South Buffalo in connection with the sewer improvement. This building will require about 150 tons of reinforcing bars and about the same amount of structural steel.

Structural and reinforcing bar lettings have shown a slackening in the past two weeks. Explanation is said to lie in the fact that most erectors covered their requirements previous to the price rise.

Pig iron business remains quiet with a flow of small orders. Operations show no change.



... Gulf States plant to add open hearths.

o o o

... Steel production holds at high rate.

BIRMINGHAM, April 27.—Officials of the Republic Steel Corp., on an inspection trip last week, stated that two additional open-hearth furnaces were planned for the newly acquired Gulf States Gadsden works in the near future and that later consideration would be given to expanding facilities for the production of finished and semi-finished steel.

The Bessemer plant of the Pullman-Standard Car Mfg. Co. has an order for 150 box cars from the National Railways of Mexico, which

was booked some weeks ago but announced only last week.

The coal situation is unchanged, as a new wage contract has not yet been negotiated. All of the major coal mining operations, with one exception, are shut down. For the time being the iron and steel producers are fully stocked and the cessation of mining is not interfering with operations.

New steel tonnage continues to flow in at a good rate and there is still no let-up in production and shipments. Last week 17 open hearths and 16 blast furnaces were operating and the same number is scheduled for this week.



Richmond, Fredericksburg & Potomac has ordered six locomotives of 4-8-4 type from Baldwin Locomotive Works.

New York, New Haven & Hartford is considering purchase of six to 10 electric locomotives of 4-6-6-4 type.

Chinese Minister of Railways is inquiring for 40 to 65 locomotives of 2-8-2 type and 10 of 2-8-4 type. Chang Kung-Chuan is minister of railways, Nanking, China. (Reported in less detail in THE IRON AGE, April 15, 1937.)

Bangor & Aroostook has ordered five Consolidation type locomotives from American Locomotive Co.

National Railways of Mexico have ordered eight articulated locomotives of 2-6-6-2 type and 10 4-6-4 type from American Locomotive Co., 250 30-ton narrow gage box cars, 150 50-ton standard-gage box cars and 250 car sets of 40-ton standard-gage trucks from Pullman-Standard Car Mfg. Co.; 175 standard-gage box cars each from American Car & Foundry Co. and General American Transportation Corp.

Tennessee, Coal, Iron & Railroad Co. has ordered 19 70-ton ore cars and 21 70-ton gondola cars from Pullman-Standard Car Mfg. Co.

Canadian National has ordered 50 air-conditioned coaches from Canadian Car & Foundry Co.

Chicago, Rock Island & Pacific has been authorized to lease for seven years, 10 100-ton, 600-hp. diesel-electric switching locomotives from Electro-Motive Corp.

Union Pacific is inquiring for 1000 50-ton gondola cars, which apparently is part of a program recently mentioned in The Iron Age.

Louisiana & Arkansas, which several weeks ago ordered 100 box cars from Pullman-Standard Car Mfg. Co., has increased the number to 150, and has also ordered 50 70-ton hopper cars from General American Transportation Co.

Koppers Co., Pittsburgh, will purchase 700 hopper cars.

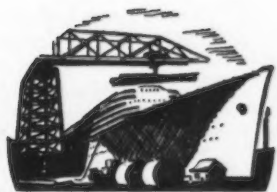
New York Central is contemplating a large car buying program.

Atlantic Coast Line has awarded 400 50-ton box cars, 100 50-ton automobile cars, without loaders, 100 50-ton automobile cars, with loaders to Mount Vernon Car Mfg. Co., and 100 70-ton phosphate cars, 15 passenger and 15 express cars to Bethlehem Steel Co.

RAILS AND TRACK SUPPLIES

Richmond, Fredericksburg & Potomac has ordered 3100 tons of 131-lb. rails from Bethlehem Steel Co.

Colorado & Wyoming is inquiring for 395 tons of rails, 50,000 tie plates, 575 kegs of spikes, 150 kegs of bolts and 1100 angle bars.



... PHILADELPHIA ...

... Orders and shipments are about on a par, sellers report.

o o o

... Backlogs have not been noticeably reduced as yet.

o o o

... Operations remain at 67½ per cent of capacity.

PHILADELPHIA, April 26.—Market conditions are practically unchanged from last week. April bookings so far resemble those of February more than March, which was accompanied by a mad scramble on the part of buyers to place themselves on the books. Operations are unchanged at 67½ per cent of capacity.

Prices generally have been reaffirmed for third quarter shipment. Satisfaction has been expressed here in behalf of the price reaffirmation, most salesmen hoping that this action presages an extended period of normally good business, as opposed to the abnormal conditions which characterized every phase of the present high operating rate until demand began to slacken a few weeks ago. Consumers are relieved of the uncertainties attached to their positions, and may be expected to place their orders in a more normal manner over the next few months.

The price of No. 1 heavy melting steel is unchanged this week, although further reductions in No. 2 steel and other items in the list have been made.

Pig Iron

One or two sellers are finding it possible to supply occasional buyers with spot shipments of 100 to 200 tons, although inquiry exists for much greater tonnages. Business is being booked against the output of the Riddlesburg stack, which is expected to be in blast by the first part of May, and some iron may be available for export. An English inquiry for 5000 tons has been received and quotations of \$2 to \$3 a ton over domestic prices are said to have been made. Sellers and producers seem willing to have the price stay where it is, and those who expect an increase

are gradually becoming a minority. Foundries are operating at high rates.

Plates and Sheets

Important tonnages of plates are few and far between now that the Pennsylvania specifications are in, and shipbuilding has quieted. Miscellaneous demand is good, however, and backlogs are not being reduced. Sheet buying is keeping up in spite of the tremendous waits for deliveries some companies are quoting. Uses are well diversified.



... CINCINNATI ...

... Price announcement checks buying.

o o o

... Less pressure also in coke and pig iron.

CINCINNATI, April 27.—The price announcement on steel for third quarter has retarded ordering. Present quotations will hold on all business prior to Oct. 1, "subject to change in our base prices, extras, differentials or functional allowances at any time we see fit." A large number of users are now under cover for third quarter. Automobile specifications are active, but reports of only small changes in models this year cause the trade to believe that purchases

Wire Products

Leading producers have reaffirmed present prices for next quarter. Previous covering has caused the past few weeks to be rather quiet. Deliveries of strip are now averaging three months, with some specialty grades requiring even longer. Ordinary wire takes two to four weeks for shipment, while six to seven weeks' wait is necessary for nail buyers. Orders are well under shipments, but more time will be necessary before a noticeable decrease in backlogs will be seen.

Structural Shapes and Reinforcing Bars

Local awards are negligible this week and no jobs of importance are reported to be forthcoming over the next few weeks. Tonnages of over 100 tons in reinforcing bars are practically non-existent, although it is said that the volume of 5, 10, 25 and 50-ton jobs is impressive in the aggregate.

Imports

The following iron and steel imports were received here during the past week: 8200 tons of manganese ore from the Gold Coast; 1 ton of steel forgings from Sweden; 9 tons of steel bands, 5 tons of diamond plates, 49 tons of steel bars and 107 tons of structural shapes from Belgium, and 16 tons of structural shapes from France.

for die tryouts will be small and that regular ordering will be steady. Jobbers are in the market for substantial quantities of sheets, but refrigerator manufacturers have eased up on orders. This latter development is reported to be the result of efforts of refrigerator makers to spread production over the year rather than succumb to feverish peak periods.

With coke prices steadier, industrial consumers are ordering in easier quantities, the almost hysterical demand of a few weeks ago having disappeared. Current business is at good rate and reflects the steady good melt. Retail sales effort, however, has stimulated an unusually heavy demand for domestic sizes and ovens are being pressed hard to make delivery. Prices on domestic sizes are unchanged at \$6.50, Cincinnati, and no increase is anticipated.

Pig iron ordering is featureless. Consumers are ordering in small quantities to fill in needs while specifications against contracts are steadily heavy. Foundries are running full heats as demand for castings mounts.



... CLEVELAND ...

... New buying eases as result of extension of prices into third quarter.

o o o

... No decision reached on pig iron, but there may be no advance at present.

o o o

... Production will hold at current levels for some weeks.

CLEVELAND, April 27. — Present prices have been named for the third quarter on all steel products by most producers, and the few that have not yet announced prices are expected to fall in line. There is talk of revision of quantity extras on galvanized sheets and narrow hot rolled strip. However, no change in the base prices of these products is proposed.

Pig iron is the only product on which the third quarter prices have not been established. Furnaces in the Central district seem rather lukewarm toward a price advance and at present it seems quite doubtful whether an advance will be made, especially in view of the fact that steel prices have not been marked up. Some producers do not plan to open their books for the sale of pig iron for the coming quarter until around June 1 and would prefer postponing an announcement on prices until around that date.

New business in finished steel took quite a drop as soon as consumers knew that they would not have to pay an advance for third quarter delivery. While shipments are heavier than incoming orders, deliveries as yet show little improvement. Operations have not been affected by the slowing down in orders and, with the heavy backlog, ingot output is expected to be maintained near present levels for some time. Ingot output in the Cleveland-Lorain district is off one point to 86 per cent of capacity this week. In the Youngstown district it is unchanged at 89 per cent.

The most conspicuous change in the situation that has resulted from the extension of present prices through the third quarter is the easing up of pressure for second

quarter deliveries by many consumers who were anxious to have their steel shipped before July 1 to avoid the possibility of having to pay higher prices. These are now asking mills to defer deliveries until the next quarter. These extensions are enabling mills to make more prompt deliveries particularly of sheets to some consumers who are actually in need of steel.

The incentive to forward buying has been removed to a large extent by the extension of present prices and a rush to place third quarter contracts is not looked for.

Bars, Plates and Shapes

Miscellaneous demand for merchant bars is holding up well, although there has been some slackening in the volume of business since the establishment of present prices for the third quarter. Some of the mills are gaining a little on deliveries of both carbon and alloy bars. Plate backlogs continue heavy. Activity in the construction field is light. However, considerable tonnage is pending for identified projects, which is expected to be placed by April 30, when protections expire.

Pig Iron

Third quarter prices are attracting an increased amount of interest, with producers divided as to whether pig iron, like steel, should remain at present prices for the third quarter or whether it should be advanced. Sentiment in favor of an advance seems to be centered largely in the East, where considerable iron has been sold for export. Some producers seem inclined to defer the naming of prices until around June 1, as developments in the meantime might influence their decision. Shipments this month have been heavier than in January

and February, although considerably below March, when the price advance drove out heavy specifications. Reports indicate that there is no decline in the melt. Considerable foreign inquiry continues to come out, but no sales for export are reported by Central Western furnaces.

Sheets

New business has declined considerably since the reestablishment of present prices for the third quarter. With the shipments in excess of new orders, backlogs are being reduced and deliveries have improved on some grades, particularly cold rolled sheets, which can be purchased for shipment in six to seven weeks. While automobile manufacturers are not ordering in as large lots as early in the season, considerable new business is pending from that source and is expected to be placed during the week.

Strip Steel

While there is not much new demand, mills have large enough backlogs to keep them busy through the remainder of the quarter, those that make both products being further behind in deliveries on cold rolled strip than on cold rolled sheets. Deliveries on hot strip range from six to 10 weeks.

Bolts, Nuts and Rivets

With the reestablishment of present steel prices, bolt, nut and rivet manufacturers state that undoubtedly their present prices will be extended through the third quarter. However, they may not make formal announcement of prices for the coming quarter until a little later.

Iron Ore

While Lake vessels are being delayed by ice conditions and fogs, a large number of boats have taken ore cargoes at the Upper Lake ports this month, and April shipments, which are expected to break previous records for the month, may reach 2,500,000 tons. There are 304 boats available for carrying ore this season or 17 less than last year. The capacity per trip, based on 19-ft. draft, is 2,594,600 tons, compared with 2,698,700 tons last year.

J. & L's Net Income \$1,982,394 in Quarter

JONES & LAUGHLIN STEEL CORP. reports net income of \$1,982,394 for the first quarter of 1937, compared with a net loss of \$933,275 for the same period in 1936.



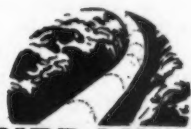
... Steel outlook is bright.

TORONTO, April 27.—The Oshawa strike has tended to slow down buying by the General Motors Corp., but other automotive companies continued operations on regular schedules. Settlement of the strike will bring immediate resumption of work, and there will be a speeding up in operations to catch up with orders.

Outlook for the future in the steel markets is bright. There are good orders pending for structural steel as well as a steady demand for other products.

Pig iron melters are showing interest in the market, but demand is almost entirely for spot delivery. Production of iron continues high.

Heavy melting steel, turnings and other steel scrap are in limited supply and mills are taking all that is offered. Iron grades also are scarce. Top prices are being paid.



....PIPE LINES....

Cities Service Gas Co., Bartlesville, Okla., has authorized new welded steel pipe line from main gas pipe line in Seminole County, Okla., to natural gasoline plant of Carter Oil Co., near Ada, Okla., about 47 miles, for natural gas transmission. Booster stations will be installed at points along route. Cost over \$400,000. Company is a subsidiary of Cities Service Co., New York.

D. D. Oil Co., Mission, Tex., F. D. Davenport, head, plans 8 and 10-in. welded steel pipe lines from oil field districts in Hidalgo and Starr Counties to Brownsville and Point Isabel, Tex., for crude oil transmission. Cost close to \$200,000 including pumping stations along route for booster service.

Quartermaster Supply Office, Columbus General Depot, Columbus, Ohio, asks bids until May 14 for 5600 ft. of black steel pipe, 3/4 to 3 in. (Proposal 214-8).

Pure Transportation Co., Bay City, Mich., has work under way on new welded steel pipe line from Beaverton in Buckeye oil field, Mich., to Greendale, about 33 miles, for crude oil transmission on basis of about 18,000 bbl. per day. Connection will be made at last noted point with existing pipe line to company terminal plant on Bay City waterfront. Cost close to \$100,000.

Talihima Gas Co., Talihima, Okla., has let contract to G. A. Henshaw, Colcord Building, Oklahoma City, for new 6-in. welded steel pipe line from Red Oak, Okla., to Talihima, about 25 miles, for natural gas transmission. Cost over \$80,000.

Barnsdall Refining Corp., Petroleum Building, Tulsa, Okla., plans welded steel

pipe line between main turning basin at Corpus Christi, Tex., and turning basin at Avery Point, Corpus Christi district, in connection with new oil refinery and terminal at last noted place.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until May 17 for 10 to 30 bomb bodies, seamless tubing or welded pipe construction (Circular 758).

T. W. Phillips Oil Co., Butler, Pa., T. W. Phillips, president, plans welded steel pipe line in connection with development of natural gas properties in Cambria County; also steel pipe line gathering system in field.



... Awards of 5900 tons —21,180 tons in new projects.

AWARDS

Bridgeport, Conn., 525 tons, Bridgeport Brass Co., to Concrete Steel Co.

Hartford, Conn., 500 tons, electric light plant, to Concrete Steel Co.

Gloucester, Mass., 150 tons, fish pier, to Concrete Steel Co.

New York, 350 tons, Williamsburgh housing project, to Concrete Steel Co.

New York, 105 tons, school No. 117, to Capital Steel Co.

New York, 250 tons, 1001 Jerome Avenue Corp. apartment house; bars to be furnished by Industrial Engineering Co. from unnamed source.

Frankfort, Ky., 700 tons rail steel, building for Stag Distillery Co., to Pollak Steel Co. through Frank Messer & Sons.

Detroit, 200 tons, building for Michigan Bell Telephone Co., to Bethlehem Steel Co.

Chicago, 1400 tons, Phoenix-Kraft Cheese Co., to Concrete Steel Co.; previously reported to Carnegie-Illinois Steel Corp.

State of Wisconsin, 200 tons, road work, to Concrete Steel Co.

Potholes, Cal., 2114 tons, All-American project, to Judson-Pacific Co.

Cody, Wyo., 138 tons, Shoshone reclamation project, to Bethlehem Steel Co.

Odair, Wash., 260 tons, Columbia Basin project; 111 tons to Colorado Fuel & Iron Co., 149 tons to Carnegie-Illinois Steel Corp.

Oakland, Cal., 300 tons, superstructure for San Francisco-Oakland Bay bridge, to Concrete Engineering Co.

Covina, Cal., 100 tons, Covina Union high school, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

Hartford, 550 tons, water supply system; bids to be taken May 17 by Board of Contract and Supply.

Brooklyn, 3455 tons, sewer work, Flatbush Avenue and Avenue U; bids April 28.

Buffalo, 300 tons, sewer divisions for sewage disposal plant; P. Tomasetti Contracting Co., Brooklyn, low bidder.

Erie, Pa., 100 tons, post office; bids soon.

Richmond, Va., 200 tons, high school.

Detroit, 300 tons, General Motors building.

Chicago, 6000 tons rail steel, Goldblatt Stores buildings; bids soon.

Chicago, 1000 tons rail steel, Wesley Memorial hospital; bids soon.

Chicago, 500 tons rail steel, mail order house; bids soon.

Chicago, 500 tons rail steel, Moody Bible Institute building; bids soon.

Sioux City, Iowa, 1500 tons rail steel, reservoir; bids soon.

Chicago, 270 tons, second section Jane Addams housing project; Maurice Bein, low bidder.

Chicago, 600 tons, 103rd Street viaduct.

Des Plaines, Ill., 300 tons, sewer, section No. 9.

Hastings, Neb., 5427 tons, Morning Glory spillway, Keystone reservoir; bids to be opened May 21 by Central Nebraska Public Power and Irrigation District.

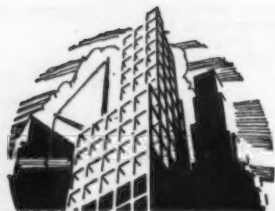
Helena, Mont., 175 tons, business building in Hale Square; bids about June 1.

Reinforcing Steel Institute to Meet

THE Concrete Reinforcing Steel Institute will hold its 13th annual meeting at the Homestead, Hot Springs, Va., April 30 and May 1. W. E. Reynolds, assistant director of procurement, U. S. Treasury Department, Washington, will speak on "Public Buildings and Your Industry." Other guest speakers will include Col. Willard Chevalier, vice-president, McGraw-Hill Publishing Co., who will discuss "Better Selling to Salvage Profits." On the side of steel, Robert Gregg, vice-president in charge of sales, United States Steel Corp., has chosen the subject, "Observations on the Concrete Bar Industry After Five Years of Detachment." At the closing session, members of the institute will witness the film, "Steel—From Raw Material to Finished Product," presented by L. S. Marsh, manager, department of inspection and metallurgy, Inland Steel Co.

Packard Buys Steel For 1938 Models

CERTAIN indication that 1938 automobile production will get a very early start is given by the fact that Packard Motor Car Co. will begin to receive its steel for 1938 models in May. Die tryouts also are scheduled for that month. First call was for enough steel to build 50,000 cars, but before business was finally placed the order was increased to take care of 55,000 cars, the 10 per cent increase being a reflection of increasing optimism for next year.



...NEW YORK...

... Stabilizing of prices for third quarter causes general satisfaction.

o o o

... New buying is easier, but mills have ample backlogs to sustain output.

o o o

... Pig iron pressure also eases as price rise appears less likely.

NEW YORK, April 27.—Following the announcement by the Carnegie-Illinois Steel Corp. and the American Steel & Wire Co. that present prices on the products they manufacture will be extended to cover shipments through the third quarter, other steel companies have notified their customers to the same effect. Although the Carnegie-Illinois announcement came as a complete surprise to other steel companies, some of which apparently had no intention of saying anything about third quarter prices at this time, there is now general satisfaction among sellers, as well as buyers, that this stabilizing move has been made. While it will have the effect of leveling off the volume of buying, and, in fact, has already done so to some extent, production will not suffer in the near future, although some expectations of reduced operations in the third quarter are entertained. However, some mills are already sold out through the third quarter on certain products, particularly sheets and plates.

With the third quarter price situation clarified, steel companies that had been relaxing in their selling efforts because of their sold-up condition, are now actively soliciting business for third quarter and for such open spaces as they have on their schedules for this quarter. Although steel companies have held the belief that some of their customers might have overbought for shipment in this quarter, there has been no indication as yet that there will be any requests for deferred deliveries. On the contrary, pressure for steel for early consumption still exists, but the hectic fea-

tures of the market have more or less disappeared.

The extension of present prices through the third quarter will give the steel companies an ample opportunity to study their costs in relation to present selling prices. It is too early for any thought of steel prices in the fourth quarter, but nevertheless there is reason for believing that the whole subject will be carefully considered before it comes time to announce fourth quarter prices. It is said that some prices are still out of line with costs—galvanized sheets being a conspicuous example—and this and similar situations that may be brought to light will receive later consideration.

The railroad equipment field offers one of the most promising prospects for new steel business during the next several months. It is believed that enough business will develop to keep the car builders and the railroads' own car shops busy throughout the remainder of the year. The New York Central has a large car buying program under consideration and other roads are still studying their future requirements.

Pig Iron

Reaffirmation of finished steel prices for third quarter has affected sentiment in pig iron markets, and those in the trade now feel that pig iron quotations are less likely to advance soon. There are some who feel that present quotations may continue through the third quarter. This feeling has caused large consumers of pig iron to adopt an easier attitude on the question of deliveries, and, with

specifications in many instances from large users less pressing, furnaces find that they have more spot iron to offer. Resumption of shipment down the State barge canal has contributed to the easier supply situation. A shipment by this route of 10,000 tons of iron from Buffalo is reported, this tonnage being scheduled for export to a foreign buyer. In general, while export inquiry has been heavy recently, producers have minimized its importance due to reports that a large part of this inquiry has not been authentic. Some furnaces, however, have a considerable tonnage already booked for export, in addition to their domestic business, and will be shipping abroad over the next few months. The stack at Troy, N. Y., will go into blast the first of next week.

Reinforcing Steel

Reinforcing bar activity this week is the best in some time, according to reports from sellers. Concrete Steel Co. figured prominently in the week's awards, getting jobs at Hartford and Bridgeport, Conn., Gloucester, Mass., and New York, totaling 1450 tons. Several pending projects, upon which bids have already been taken, will require a fair tonnage of bars. In addition, an inquiry for 3455 tons of bars for a Brooklyn sewer has been issued, bids to be received April 28. Work on the Hartford water supply system, requiring about 550 tons of reinforcing steel, will be up for bids May 17.

Crucible Steel is Running Nearly Full

THE Crucible Steel Co. of America is operating almost at full capacity and is booking orders in sufficient volume to insure the continuance of such operations for some time, stockholders were told at their annual meeting in Jersey City, April 21, by F. B. Hufnagel, president. Earnings in the first quarter, it was said, were at an annual rate of \$5,000,000.

J. Howard Pew, president of the Sun Oil Co., was elected a director to succeed the late Horace S. Wilkinson.

Mr. Hufnagel said that the company's electrolytic tin plate equipment is again in operation after delays occasioned by fire damage. He said that while the new plant is manufacturing material for special uses, ultimately the company would enter the general tin plate market. He said the electrolytic process has large possibilities for working with metals other than tin.



..SAN FRANCISCO..

... Reclamation projects call for 3754 tons of bars.

o o o

... Navy dry dock plans are being revised.

SAN FRANCISCO, April 26.—Bids were opened last week on 11 invitations for reclamation projects involving 3754 tons of reinforcing bars. Of these, 1451 tons is called for in the Columbia Basin project and 1579 in the All-American Canal project. The largest award of the week, 2114 tons of reinforcing bars, was also a part of the All-American Canal project. This tonnage went to Judson-Pacific Co.

Awards were slightly larger and more numerous again in structural and reinforcing markets. Howe

Sound Co., Okanogan County, Wash., awarded 1000 tons of structural shapes to Isaacson Iron Works. At Seattle, Pacific Car & Foundry Co. took 700 tons of shapes for a Boeing airplane plant.

Salem, Ore., awarded 1000 tons of cast iron pipe to U. S. Pipe and Foundry Co. This material is to be used in the Santiam River project.

Attention is again returning to the Pearl Harbor, T. H., drydock on which bids were first opened early last fall and rejected as exceeding the appropriation. The Navy Department is reportedly revising plans before again opening bids. The department is also reported to be revising plans for a 446-ft. drydock scheduled for Honolulu. Estimated cost of the former is \$10,000,000 and the latter \$750,000. Both will be built on the Pacific Coast, though dredging of a slip will be necessary to accommodate the larger drydock.

Prices on most forms of steel have been reaffirmed for the third quarter so that steel companies may make advance bookings with certainty as to price. Production is holding up to near capacity. Advance orders run from 10 to 14 weeks.



..GREAT BRITAIN..

... Pig iron stringency still acute.

o o o

... Higher export prices on bars and shapes.

LONDON, April 27 (By Cable).—Efforts to secure bigger tonnages of pig iron and steel so far have not been very successful, and the stringency is acute. Much anxiety is felt about future price levels and producers and consumers are eagerly awaiting price announcements. Pig iron prices may not be altered until the end of the half year. Revised steel prices will govern deliveries after June 1, and, as new orders cannot be accepted before then, business is either wholly suspended, or orders are placed at prices ruling at the time of delivery.

The shortage of pig iron is pronounced and there is no early prospect of relief. Steel works are using more pig iron owing to the scrap shortage, while other consumers are going short. Deliveries this month are curtailed all around.

Continental deliveries of semi-finished steel are still far short of quota. Pressure for supplies of finished steel is unprecedented as expanding home demand is reinforced by the rearmament program and a lively export demand.

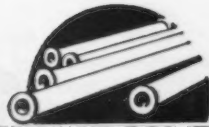
National Union of General and Municipal Workers have applied to the Iron and Steel Trades Employers Association for a 15 per cent wage increase for iron and steel workers.

Tin plate business is quiet as some consumers are well covered and others are awaiting a clearer price outlook.

Continental iron and steel production is rising owing to seasonal improvement of the fuel and ore output, so that export releases are larger, though still inadequate.

British export price of steel bars is raised to £11; beams, channels and angles to £10 12s. 6d.

Continental gold prices remain unchanged.



..CAST IRON PIPE..

Cuba City, Wis., has called special election in May to approve bond issue for \$25,000 for pipe lines for water system and other waterworks installation.

Santa Ana, Cal., closes bids May 3 for 10,000 ft. of 4 to 12-in. pipe for water system. J. L. McBride is city engineer and water superintendent.

Charlotte, N. C., plans call for bids in May for new 30-in. pipe line for main water supply from Catawba River. J. B. Marshall is city manager.

Osterville Fire District, Osterville, Mass., C. H. Brown, chairman of committee in charge, plans about 20 miles of 6 to 12-in. for water system; also new pumping station, elevated steel tank and tower, and other waterworks installation. Cost about \$450,000. Financing is being arranged through Federal aid. Whitman & Howard, 89 Broad Street, Boston, are consulting engineers.

Dry Ridge, Ky., will take bids soon for main pipe line for water supply from Williamstown, Ky., to Dry Ridge, including 50,000-gal. elevated steel tank and tower at last noted place. Cost about \$40,000. H. K. Bell, McClelland Building, Lexington, Ky., is consulting engineer.

Chicago takes bids April 29 on 300 cast iron valve boxes for 4-in. valves.

Alamosa, Colo., has arranged bond issue of \$60,000 for pipe lines for extensions and improvements in water system.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 4 for 10,000 ft. of cast iron soil pipe (Schedule 544), for Brooklyn and Sewall's Point Navy Yards.

Benton Harbor, Mich., closes bids May 4 for 6810 ft. of 12, 16 and 20-in. for main water supply lines. H. H. Crow is city manager. Ayres, Lewis, Norris & May, Ann Arbor, Mich., are consulting engineers.

Alliance, Ohio, will take bids soon for extensions and replacements in main water lines, including new lines in Ridgewood and Pennsylvania Avenues and other thoroughfares. Cost about \$35,800. W. D. Sponseller, Alliance, is engineer.

Board of Trustees, St. Mary's College, Lebanon, Ky., will take bids soon for main pipe line for water supply from Lebanon town limits to institution, about 4½ miles. H. K. Bell, McClelland Building, Lexington, Ky., is consulting engineer.

Dresser Junction, Wis., plans pipe lines for water system and other waterworks installation, including pumping station. Fund of \$25,400 has been secured through Federal aid. Work scheduled to begin soon. Banister Engineering Co., 556 North Prior Avenue, St. Paul, Minn., is consulting engineer.

Alice, Tex., will take bids soon for about 14,000 ft. 4 to 8-in. for water system; also for other waterworks installation, including deep-well pumping station and water reservoir. Cost about \$45,000. J. E. Ward, Harvey-Snyder Building, San Antonio, Tex., is consulting engineer.

Salem, Ore., has awarded 1000 tons for Santiam River project to United States Pipe & Foundry Co.

South Gate, Cal., has awarded 182 tons of 4 and 6-in. to American Cast Iron Pipe Co.

Manhattan Beach, Cal., has awarded 110 tons for a water system to National Cast Iron Pipe Co.

Hawthorne, Cal., has opened bids on 102 tons of 2, 4 and 6-in.; National Cast Iron Pipe Co., low bidder.

Pomona, Cal., has opened bids on 190 tons for a water system.



FABRICATED STEEL

... Lettings again lower at 12,550 tons as against 14,200 tons last week.

o o o

... New projects decline to 13,905 tons compared with 14,120 tons in the previous week.

o o o

... Plate awards total 2495 tons.

NORTH ATLANTIC STATES

Darlington, N. J., 550 tons, chapel building, Immaculate Conception Seminary, to Selbach-Meyer Co., West New York, N. J.

Queens, N. Y., 115 tons, foundations for Flushing River bridge, to American Bridge Co.

Albany, N. Y., 250 tons, transit shed No. 5, to Leech Steel Corp., Rochester, N. Y.

Albany, 480 tons, S. S. Kresge store, to Harris Structural Steel Co., Plainfield, N. J.

Chapman, Pa., 115 tons, pack house, Lehigh Portland Cement Co., to Lehigh Structural Steel Co., Allentown, Pa.

Avonmore, Pa., 400 tons, State highway bridge, route 379, to American Bridge Co.

Clearfield, Pa., 510 tons, State highway bridge, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Armstrong County, Pa., 140 tons, bridge, route 378, to Reliance Steel Products Co., Rankin, Pa.

McKean County, Pa., 174 tons, bridge, to Bethlehem Steel Co.

SOUTH AND SOUTHWEST

Norfolk, Va., 550 tons, addition to machine shop, to Virginia Bridge Co., Roanoke, Va.

Medical College, Va., 225 tons, dormitory, to Dietrich Brothers, Baltimore.

Jefferson, Miss., 135 tons, highway bridge, to Vincennes Bridge Co., Vincennes, Ind.

Vicksburg, Miss., 335 tons, National Park bridge, to Illinois Steel Bridge Co., Jacksonville, Ill.

Sunflower County, Miss., 125 tons, highway bridge, to Nashville Bridge Co., Nashville, Tenn.

Wayne County, Miss., 180 tons, highway bridge, to Virginia Bridge Co.

Franklin and Lincoln Counties, Miss., 185 tons, highway bridge, to Vincennes Bridge Co.

Dallas, Tex., 700 tons, telephone building, to Bethlehem Steel Co.

Santa Fe, N. M., 250 tons, railroad crossing and approaches, to an unnamed bidder.

CENTRAL STATES

Barberton, Ohio, 100 tons, building for Sun Rubber Co., to Burger Iron Co., Akron.

Springfield, Ohio, 540 tons, addition to power house, Commonwealth & Southern Power Co., to Whitehead & Kales Co.

Gas City, Ind., 1010 tons, factory building, Owens-Illinois Co., to Indiana Bridge Co.

East Peoria, Ill., 710 tons, addition to power house, Commonwealth & Southern Power Co., to Whitehead & Kales Co., Detroit.

Streator, Ill., 170 tons, Owens-Illinois Glass Co., to Indiana Bridge Co., Muncie, Ind.

Springfield, Ill., 120 tons, subway section, to Gage Structural Steel Co., Chicago.

Chicago, 1400 tons, Central Steel & Wire Co., to American Bridge Co.

Waterloo, Iowa, 145 tons, post office, to an unnamed bidder.

Clinton, Iowa, 500 tons, bridge, to Clinton Bridge Works, Clinton.

WESTERN STATES

Denver, 102 tons, road construction, to an unnamed bidder.

Los Angeles, 450 tons, Roosevelt Highway bridge, to Bethlehem Steel Co.

Los Angeles, 365 tons, bridge, to Minneapolis-Moline Power Implement Co.

Seattle, 700 tons, Boeing airplane plant, to Pacific Car & Foundry Co.

Okanogan County, Wash., 1000 tons, Howe Sound Co. buildings, to Isaacson Iron Works, Seattle.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Boscawen-Canterbury, N. H., 200 tons, State bridge.

New York, 3900 tons, contract No. 4, Lincoln tunnel.

New York, 660 tons, Westchester Avenue bridge in Bronx.

Endicott, N. Y., 340 tons, elementary school.

Endicott, 400 tons, grade separation bridge.

Port Newark, N. J., 250 tons, oil refinery building for Swift & Co.

Lock Haven, Pa., 750 tons, manufacturing building, New York & Pennsylvania Co.

Washington, 1500 tons, chain bridge.

CENTRAL STATES

Detroit, 500 tons, machine shop expansion, Chrysler Jefferson Avenue plant; Albert Kahn, architect.

Youngstown, 540 tons, annealing covers, United Engineering & Foundry Co.

Akron, Ohio, 650 tons, grade crossing elimination; Bates & Rogers Construction Co., Chicago, general contractor.

Fort Wayne, Ind., 350 tons, highway and railway bridge, General Electric Co.

Moorhead, Minn., and Fargo, N. D., 900 tons, Red River bridge for State of Minnesota.

Oswego, Ill., 170 tons, bridge.

State of South Dakota, 550 tons, bridge.

Hastings, Neb., 400 tons, outlet works for Morning Glory spillway, Keystone reservoir; bids to be opened May 21 by Central Nebraska Public Power and Irrigation District.

WESTERN STATES

Helena, Mont., 392 tons, four bridges; bids May 3.

Stockton, Cal., 250 tons, telephone exchange building; bids opened.

Hollywood, Cal., 1200 tons, turf club.

Seattle, 5500 tons, transmission towers for Skagit Line; Bethlehem Steel Co., low bidder.

FABRICATED PLATES

AWARDS

Chicago, 1160 tons, 34 tanks for Pure Oil Co. scattered through five States, to Graver Tank & Mfg. Co.

Baytown, Tex., 560 tons, four spherical pressure vessels, Humble Oil & Refinery Co., to Chicago Bridge & Iron Works.

Port Arkansas, Tex., 775 tons, oil storage tanks, Humble Pipe Line Co., to Pittsburgh-Des Moines Steel Co.

NEW PROJECTS

New Orleans, 1300 tons, five to six steel barges for River Terminal Corp.

SHEET PILING

AWARDS

Grantsville, Md., 180 tons, resettlement project, to Bethlehem Steel Co.

NEW PROJECTS

Milwaukee, 450 tons, United States Engineer Office, for delivery at Kaukauna, Wis.; Carnegie-Illinois Steel Corp., low bidder.

Hastings, Neb., 9400 tons, Morning Glory spillway, Keystone reservoir; bids to be opened May 21 by Central Nebraska Public Power and Irrigation District.

Denver, 100 tons, Bureau of Reclamation Bull Lake dam; bids taken April 28.

Calexico, Cal., 154 tons, Bureau of Reclamation, All-American Canal.

Red Bluff, Cal., 369 tons, piling for bridge over Sacramento River; bids May 5.

Orders For Structural Steel Expand in March

ORDERS placed for fabricated steel in March were the largest since July, 1936, according to the American Institute of Steel Construction. The total was 182,049 tons for March, against 88,946 tons for February and 108,826 tons for March, 1936. Shipments rose to 131,691 tons in March, compared with 91,848 tons in the preceding month and 107,687 tons in the corresponding period a year ago. At the end of the quarter unfilled orders totaled 561,212 tons.



...NON-FERROUS...

... Producers lower zinc price \$5 a ton.

... Stocks of lead reduced 19,800 tons.

NEW YORK, April 27.—Unsettlement in foreign commodity markets continues to be a material factor influencing domestic metals. Electrolytic copper, which moved down in price over a week ago to 14½c., delivered Connecticut Valley, has continued unchanged at that level, but further weakness abroad has caused export copper to sell lower than heretofore, and to-

day prices on this business range from about 14.20c. c.i.f., to as low as 13.70c. Little demand from abroad is evident. While routine sales for domestic account continue to be made, current volume of new business is small. Bookings yesterday totaled 2239 tons, with aggregate sales for the month to date of 23,381 tons.

The Week's Prices. Cents Per Pound for Early Delivery

	Apr. 21	Apr. 22	Apr. 23	Apr. 24	Apr. 26	Apr. 27
Electrolytic copper, Conn.*	14.50	14.50	14.50	14.50	14.50	14.50
Lake copper, N. Y.....	14.62½	14.62½	14.62½	14.62½	14.62½	14.62½
Straits tin, spot, New York	58.00	59.50	57.25	.....	55.37½	56.75
Zinc, East St. Louis.....	6.75	6.75	6.75	6.75	6.75	6.75
Zinc, New York.....	7.10	7.10	7.10	7.10	7.10	7.10
Lead, St. Louis.....	5.85	5.85	5.85	5.85	5.85	5.85
Lead, New York.....	6.00	6.00	6.00	6.00	6.00	6.00

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.

†Noon Price.

Aluminum, virgin 99 per cent plus 20.00c.-21.00c. a lb. delivered.

Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.

Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.

Antimony, Asiatic, 17.00c. a lb., New York.

Quicksilver, \$91.00 to \$93.00 per flask of 76 lb.

Brass ingots, commercial 85-5-5-5, 14.50c. a lb. delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig.....	58.50c. to 59.50c.
Tin, bar.....	60.50c. to 61.50c.
Copper, Lake.....	15.50c. to 16.50c.
Copper, electrolytic.....	15.50c. to 16.50c.
Copper, castings.....	15.25c. to 16.25c.
*Copper sheets, hot-rolled.....	22.12½c.
*High brass sheets.....	20.00c.
*Seamless brass tubes.....	22.75c.
*Seamless copper tubes.....	22.87½c.
*Brass rods.....	16.37½c.
Zinc, slabs.....	8.00c. to 9.00c.
Zinc, sheets (No. 9), casks, 1200 lb. and over.....	13.75c.
Lead, American pig.....	7.00c. to 8.00c.
Lead, bar.....	8.00c. to 9.00c.
Lead, sheets, cut.....	10.50c.
Antimony, Asiatic.....	18.00c. to 19.00c.
Alum., virgin, 99 per cent plus.....	24.30c.
Alum., No. 1 for remelting, 98 to 99 per cent.....	19.50c. to 21.00c.
Solder, ½ and ½.....	36.50c. to 38.50c.
Babbitt metal, commercial grades.....	25.00c. to 65.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33¼ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig.....	59.37½c.
-----------------------	----------

Tin, bar.....	61.37½c.
Copper, Lake.....	15.50c. to 15.75c.
Copper, electro-lytic.....	15.50c. to 15.75c.
Copper, castings.....	15.25c. to 15.50c.
Zinc, slabs.....	8.75c. to 9.00c.
Lead, American pig.....	6.50c. to 6.75c.
Lead, bar.....	10.00c.
Antimony, Asiatic.....	18.75c.
Babbitt metal, medium grade.....	23.50c.
Babbitt metal, high grade.....	63.37½c.
Solder, ½ and ½.....	36.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	11.00c.	11.75c.
Copper, hvy. and wire.....	10.37½c.	10.87½c.
Copper, light and bottoms.....	9.37½c.	9.62½c.
Brass, heavy.....	6.25c.	6.875c.
Brass, light.....	5.00c.	5.75c.
Hvy. machine composition.....	9.37½c.	9.87½c.
No. 1 yel. brass turnings.....	7.37½c.	7.87½c.
No. 1 red brass or compos. turnings.....	9.00c.	9.50c.
Lead, heavy.....	4.75c.	5.12½c.
Cast aluminum.....	12.12½c.	13.25c.
Sheet aluminum.....	13.25c.	14.75c.
Zinc.....	3.75c.	4.12½c.

Lead

Refined lead stocks decreased 19,804 tons last month to 137,028 tons on March 31. Shipments in March were 63,425 tons, a gain over February of 13,050 tons, while production amounted to 43,642 tons, or an increase over February of 6191 tons. Although prices were unchanged at 5.85c., St. Louis, and 6.00c. and 6.05c., New York, the favorable statistics added considerable firmness to the market. Demand was good throughout the week as consumers sought to obtain their May needs, this month being only about 65 per cent covered at present. Because of buyers' positions in this regard, little attention was paid to the opening of producers' books for June.

Zinc

Domestic weakness in zinc, following continued unsettlement abroad, resulted in a \$5 a ton reduction in price when the market closed April 20, the quotations now being 6.75c. a lb., East St. Louis, and 7.10c., New York. Fewer sales are being made now, and premiums for spot shipments are no longer being asked. Judging from orders on sellers' books, consumers appear well covered for some time to come. New business booked last week amounted to only about 3200 tons, while shipments were around 5200 tons.

Tin

After evidences of strength, which carried the tin market almost up to its level of the previous week, a recurrence of weakness in London had a depressing effect here. Yesterday, with spot Straits at New York priced at 55.37½c., the lowest since March 2, consumers resumed buying in fair quantity. At the preceding higher quotations, little buying was done, and, while demand was evident on a slight recovery in the spot price to about 56.75c. around noon today, the trend again is toward curtailment of purchases.

Ingot Brass and Bronze

Average prices received by members of the Non-Ferrous Ingot Metal Institute during 28 days ended April 16 on commercial 80-10-10 and commercial 85-5-5-5 brass ingots were 18.649c. and 16.472c. a lb. respectively. Preceding prices were slightly lower. Deliveries of brass and bronze ingots and billets by the members totaled 10,626 tons in March, against 9433 tons in February.

Fire damaged the plant of the Atlas Steel Barrel Co., Bayonne, N. J., to the extent of \$150,000.



IRON AND STEEL SCRAP

APRIL 27.—Further effects of the buying of close to 400,000 tons by the newly formed European cartel are being felt in all markets, and THE IRON AGE composite figure has declined for the third week to \$20. No. 1 heavy melting steel dropped \$1.50 at Pittsburgh and 75c. at Chicago, the Philadelphia price remaining the same, although the No. 2 grade is softer. While there is congestion in the mill yards, particularly in the St. Louis district, the only logical explanation of the almost complete lack of mill orders throughout the country in the face of an exceptionally high ingot rate seems to be a pause to await clarification of the market in the new post-cartel era.

Mills are apparently interpreting the lower-than-market cartel price as a deliberate move to break the domestic market on the part of scrap dealers themselves, and are awaiting developments. The only mill purchases of note are the taking of 10,000 tons by a Buffalo consumer and a moderate tonnage at Pittsburgh, \$1.50 under last week's quotation. At Detroit the offering of 750 carloads of miscellaneous automotive scrap will glut the already weakened market there.

An advance in railroad storage rates on the Atlantic seaboard south of New York, similar to those prevailing at New England ports, is a new factor in the export market.

Pittsburgh

The continued absence of consumers from the market had caused considerable weakness and late this afternoon (April 27) a moderate sized tonnage of No. 1 steel was sold into consumption at \$21. This is the first sale in several weeks and is considerably lower than some brokers had looked for. The latest transaction will at least clarify the situation somewhat which is what dealers have been waiting for. When this sale is covered the question of the scarcity or non-scarcity of scrap will probably be determined. On a basis of a fairly substantial sale, railroad specialties are off \$1.50 with other low phos. grades down sympathetically.

Chicago

Prices continue to drop, but the slide is leveling and more stable conditions are expected by the trade. It is indicated by a recent sale of heavy

melting steel by the Illinois Central that railroads can get prices slightly above the bottom of last week. Another factor is that heavy foreign purchases will remove much second grade tonnage from the fringe of the Chicago territory. This tonnage had an important bearing on the recent price break. Industrial scrap, moving in small lots, remains weak. It is evident that the market lacks real short interests and that the most recent sales to mills, while not representing distress tonnages actually on track, did show that brokers feared the actual appearance of such tonnages.

Cleveland

Youngstown district mills that held up deliveries of scrap for two weeks have released all shipments. These hold-ups seem to have been one factor in the recent price declines. The release of this scrap apparently has tended to check further declines on steel-making grades. However, blast furnace scrap has dropped another 25c. a ton. No consumer purchases are reported. Mills have large stocks and commitments and are showing little interest in prices. Available scrap supplies are plentiful.

Philadelphia

Although No. 1 steel is steady, No. 2 has declined further and is now at \$17.50 to \$18, with reductions also recorded in several other items. Brokers believe the current softness has reached its bottom and that the next move will be upward, though prices may not rise immediately. Mills appear to be well supplied with scrap, so that much quantity buying may not be seen soon. Bids will be taken Friday on the month's accumulation of 4000 tons of hydraulically compressed bundles from the Edward G. Budd Mfg. Co. Fresh impetus has been given the foreign scrap movement by the recent large tonnage sale. One broker has nine boats loading from Maine to Texas, while another has two being filled at Port Richmond, with more to come. Exporters feel that the permit system now being employed by the railroads may be lifted soon since the advance in railroad storage rates will have the same effect of prohibiting large accumulations of cars at docks over long periods of time. These new rate provisions allow a 10-day free period, followed by a charge of 20c. a ton for six 5-day periods, 30c. a ton for the next six 5-day periods and 40c. a ton for the succeeding six 5-day periods.

Buffalo

A steadying influence has been thrown into the sagging Buffalo market by a mill purchase of approximate-

ly 10,000 tons of No. 1 and No. 2 heavy melting steel at \$19 and \$17.50. Along with No. 1 bundles sold at \$17.50 was a considerable tonnage of old hydraulic compressed sheets at \$16.50.

Boston

Pennsylvania and New England steel mills continue to stay out of the market, consequently prices are nominal. On the other hand, the export market is very active and would be more so if the railroads lifted shipping restrictions. Two steamers are now loading here and another is scheduled to start loading the latter part of this week. One is loading at Providence, and another is due to load there shortly, while the movement of barge lots from that port to New York is constant. In the Providence area No. 1 machinery cast is active at \$18 to \$19 a ton, delivered.

New York

To the original five dealers who contracted to sell several hundred thousand tons of scrap to the newly formed European cartel has been added a sixth dealer, making the American group fully representative of those engaged in export. Estimates now place the total involved at 500,000 tons, but this figure includes sales made prior to the organization of the buyers' cartel. The immediate effect of this centralization of the export market has been to weaken the domestic market, and the absence of mill buying in this area has tended further to depress prices, although No. 1 steel remains at \$17. Cast grades have eased about 50c. on the average. Congestion of scrap at Atlantic ports is another weakening factor.

St. Louis

The scrap iron market is weaker, and several items are lower, No. 2 heavy melting and No. 1 busheling being 50c. a ton off. Other items are unchanged, but these quotations are merely nominal for lack of trading. The greatest setback has come from congestion in the yards of the steel mills, which has grown worse and has resulted in restriction of shipments. There is said to be some distress scrap in the hands of dealers. It is expected by dealers that conditions will right themselves in a few weeks. The Missouri Pacific has issued a list of 70 carloads of scrap.

Detroit

Only scattered sales have been made in a continually falling market. Mills show no interest in buying at present levels and brokers say they do not believe the bottom is in sight. Under these conditions, interest is centered on an unusually active week as far as lists offered are concerned. Combined offerings of Chevrolet's Detroit and Flint scrap and Chrysler, Buick and Pontiac materials, totaling 750 cars, will probably glut the market and may force a sharp decline again in the local quotations. Of general interest is the possible increase in open hearths suggested by renewed rumors of new furnaces at Marysville on the St. Clair River and in the Windsor area across the river.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$20.50 to \$21.00
Railroad hvy. mltng. .	21.50 to 22.00
No. 2 hvy. mltng. steel.	16.50 to 17.00
No. 2 RR. wrought . . .	20.50 to 21.00
Scrap rails	21.50 to 22.00
Rails 3 ft. and under.	25.00 to 25.50
Comp. sheet steel . . .	20.50 to 21.00
Hand bundled sheets . .	18.00 to 18.50
Hvy. steel axle turn . . .	19.00 to 19.50
Machine shop turn . . .	14.50 to 15.00
Short shov. turn	15.00 to 15.50
Mixed bor. & turn	14.00 to 14.50
Cast iron borings	14.00 to 14.50
Cast iron carwheels . . .	19.50 to 20.00
Hvy. breakable cast . . .	16.00 to 16.50
No. 1 cast	20.00 to 20.50
RR. knuckles & eplrs . . .	26.00 to 26.50
Rail coil & leaf springs .	26.00 to 26.50
Rolled steel wheels . . .	26.00 to 26.50
Low phos. billet crops . .	26.50 to 27.00
Low phos. sh. bar	25.50 to 26.00
Low phos. punchings . . .	23.50 to 24.00
Low phos. plate, hvy . . .	25.00 to 25.50
Low phos. plate clip . . .	23.50 to 24.00
Steel car axles	25.00 to 25.50

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$19.50 to \$20.00
No. 2 hvy. mltng. steel.	18.00 to 18.50
Comp. sheet steel	18.50 to 19.00
Light bund. stampings . .	14.50 to 15.00
Drop forge flashings . . .	18.00 to 18.50
Machine shop turn	12.75 to 13.25
Short shov. turn	14.00 to 14.50
No. 1 busheling	18.50 to 19.00
Steel axle turnings	16.00 to 16.50
Low phos. billet and bloom crops	26.00 to 26.25
Cast iron borings	13.75 to 14.25
Mixed bor. & turn	13.75 to 14.25
No. 2 busheling	14.50 to 15.00
No. 1 cast	20.50 to 21.00
Railroad grate bars	12.00 to 12.50
Stove plate	10.00 to 10.50
Rails under 3 ft.	25.00 to 25.50
Rails for rolling	21.50 to 22.00
Railroad malleable	21.00 to 21.50
Cast iron carwheels	22.00 to 22.50

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$19.50 to \$20.00
No. 2 hvy. mltng. steel.	17.50 to 18.00
Hydraulic bund., new . . .	19.50 to 20.00
Hydraulic bund., old . . .	16.00 to 16.50
Steel rails for rolling . . .	21.50 to 22.00
Cast iron carwheels	21.00 to 21.50
Hvy. breakable cast	19.00
No. 1 cast	22.00
Stove plate (steel wks.) . . .	16.00
Railroad malleable	19.00 to 19.50
Machine shop turn	14.00 to 14.50
No. 1 blast furnace	13.00 to 13.50
Cast borings	13.00 to 13.50
Heavy axle turnings	17.00 to 17.50
No. 1 low phos. hvy	25.00 to 25.50
Couplers & knuckles	25.00 to 25.50
Rolled steel wheels	25.00 to 25.50
Steel axles	25.50 to 26.00
Shafting	25.00
No. 1 RR. wrought	19.50 to 20.00
Spec. iron & steel pipe . . .	16.50 to 17.00
No. 1 forge fire	16.50 to 17.00
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:	
Per Gross Ton	
Hvy. mltng. steel	\$19.25 to \$19.75
Auto. hvy. mltng. steel . . .	17.50 to 18.00
Alloy free	16.50 to 17.00
Shoveling steel	19.25 to 19.75
Hydraul. comp. sheets	18.25 to 18.75
Drop forge flashings	16.50 to 17.00
No. 1 busheling	18.00 to 18.50
Rolled carwheels	23.00 to 23.50
Railroad tires, cut	23.00 to 23.50
Railroad leaf springs	22.50 to 23.00
Steel coup. & knuckles	21.50 to 22.00
Axle turnings	18.50 to 19.00
Coil springs	23.75 to 24.25
Axle turn. (elec.)	20.50 to 21.00
Low phos. punchings	23.00 to 23.50
Low phos. plates, 12 in. and under	23.00 to 23.50
Cast iron borings	11.75 to 12.25
Short shov. turnings	12.25 to 12.75
Machine shop turn	10.50 to 11.00
Rerolling rails	22.50 to 23.00
Steel rails under 3 ft.	22.00 to 22.50
Steel rails under 2 ft.	23.50 to 24.00
Angle bars, steel	22.00 to 22.50
Cast iron carwheels	20.50 to 21.00
Railroad malleable	20.50 to 21.00
Agric. malleable	17.50 to 18.00
Iron car axles	26.50 to 27.00

Per Net Ton	
Steel car axles	\$24.00 to \$24.50
No. 1 RR. wrought	16.50 to 17.00
No. 2 RR. wrought	16.50 to 17.00
No. 2 busheling, old	8.50 to 9.00
Locomotive tires	19.00 to 19.50
Pipes and flues	14.00 to 14.50
No. 1 machinery cast	16.50 to 17.00
Clean auto. cast	15.00 to 15.50
No. 1 railroad cast	15.00 to 15.50
No. 1 agric. cast	13.50 to 14.00
Stove plate	12.00 to 12.50
Grate bars	13.50 to 14.00
Brake shoes	12.50 to 13.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:	
No. 1 hvy. mltng. steel.	\$19.00 to \$19.50
No. 2 hvy. mltng. steel.	17.50 to 18.00
Scrap rails	19.00 to 19.50
New hvy. b'ndled sheet . . .	17.50 to 18.00
Old hydraul. bundles	16.50 to 17.00
Drop forge flashings	17.50 to 18.00
No. 1 busheling	17.50 to 18.00
Hvy. axle turnings	13.50 to 14.00
Machine shop turn	13.00 to 13.50
Knuckles & couplers	21.00 to 21.50
Coil & leaf springs	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
Low phos. billet crops	21.50 to 22.00
Shov. turnings	13.50 to 14.00
Mixed bor. & turn	11.50 to 12.00
Cast iron borings	11.50 to 12.00
Steel car axles	20.00 to 20.50
No. 1 machinery cast	18.00 to 18.50
No. 1 cupola cast	17.00 to 17.50
Stove plate	14.00 to 14.50
Steel rails under 3 ft.	21.50 to 22.50
Cast iron carwheels	17.00 to 17.50
Railroad malleable	19.50 to 20.00
Chemical borings	12.00 to 12.50

BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel	\$15.00 to \$18.00
Scrap steel rails	17.00 to 19.00
Short shov. turnings	9.00 to 10.00
Stove plate	9.00 to 10.50
Steel axles	18.00 to 19.00
Iron axles	16.50 to 18.00
No. 1 RR. wrought	13.00 to 15.00
Rails for rolling	18.00 to 20.00
No. 1 cast	16.00 to 18.00
Tramcar wheels	16.00 to 17.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:	
Selected hvy. steel	\$18.50 to \$19.00
No. 1 hvy. melting	18.00 to 18.50
No. 2 hvy. melting	15.50 to 16.00
No. 1 locomotive tires	20.00 to 20.50
Misc. stand.-sec. rails	19.00 to 19.50
Railroad springs	21.50 to 22.00
Bundled sheets	11.00 to 11.50
No. 2 RR. wrought	18.00 to 18.50
No. 1 busheling	13.50 to 14.00
Cast bor. & turn	7.50 to 8.00
Rails for rolling	20.00 to 20.50
Machine shop turn	9.00 to 9.50
Heavy turnings	14.00 to 14.50
Steel car axles	21.50 to 22.00
Iron car axles	22.00 to 22.25
No. 1 RR. wrought	15.50 to 16.00
Steel rails under 3 ft.	20.00 to 20.50
Steel angle bars	19.25 to 19.75
Cast iron carwheels	19.00 to 19.50
No. 1 machinery cast	15.00 to 15.50
Railroad malleable	19.50 to 20.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Agricul. malleable	12.50 to 13.00
Grate bars	12.00 to 12.50
Brake shoes	13.50 to 14.00

CINCINNATI

Dealer's buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$17.75 to \$18.25
No. 2 hvy. mltng. steel.	15.75 to 16.25
Scrap rails for mltng.	21.00 to 21.50
Loose sheet clippings	13.50 to 14.00
Bundled sheets	15.50 to 16.00
Cast iron borings	11.00 to 11.50
Machine shop turn	11.75 to 12.25
No. 1 busheling	15.00 to 15.50
No. 2 busheling	9.50 to 10.00
Rails for rolling	22.50 to 23.00
No. 1 locomotive tires	17.00 to 17.50
Short tails	23.00 to 23.50
Cast iron carwheels	17.50 to 18.00
No. 1 machinery cast	17.00 to 17.50
No. 1 railroad cast	16.00 to 16.50
Burnt cast	11.50 to 12.00
Stove plate	11.50 to 12.00
Agricul. malleable	17.00 to 17.50
Railroad malleable	18.50 to 19.00

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$16.00 to \$16.50
No. 2 hvy. mltng. steel.	15.00 to 15.50
Borings and turnings	11.50 to 12.00
Long turnings	11.50 to 12.00
Short shov. turnings	12.50 to 13.00
No. 1 machinery cast	16.75 to 17.25
Automotive cast	17.00 to 17.50
Hydraul. comp. sheets	18.00 to 18.50
Stove plate	10.75 to 11.25
New factory bushel	15.75 to 16.25
Old No. 2 busheling	11.00 to 11.50
No. 2 busheling (black fender stock)	12.00 to 12.50
Sheet clippings	12.50 to 13.00
Flashings	15.00 to 15.50
Low phos. plate scrap	17.00 to 17.50

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$21.00 to \$21.50
Hydraulic bundles	20.50 to 21.00
Machine shop turn	15.00 to 15.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$16.50 to \$17.00
No. 2 hvy. mltng. steel.	15.00 to 15.50
Hvy. breakable cast	14.50 to 15.00
No. 1 machinery cast	16.00 to 16.50
No. 2 cast	14.50 to 15.00
Stove plate	12.00 to 12.50
Steel car axles	25.00 to 26.00
Shafting	20.00 to 20.50
No. 1 RR. wrought	17.50 to 18.00
No. 1 wrought long	16.50 to 17.00
Spec. iron & steel pipe	14.50 to 15.00
Rails for rolling	18.50 to 19.00
Clean steel turnings	9.00 to 9.50
Cast borings	9.50 to 10.00
No. 1 blast furnace	9.50 to 10.00
Cast borings (chem.)	12.00 to 12.50
Unprepar. yard scrap	9.50 to 10.00
Per gross ton, delivered local foundries:	
No. 1 machn. cast	\$18.00 to \$18.50
No. 1 hvy. cast cupola	15.50 to 16.00
No. 2 cast	14.50 to 15.00
Add 50c. to 75c. to above quotations to secure North Jersey prices.	

BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$16.30 to \$16.80
Scrap rails	16.30 to 16.80
No. 2 steel	15.25 to 15.75
Breakable cast	14.60 to 15.50
Machine shop turn	9.50 to 9.85
Mixed bor. & turn	7.80 to 9.20
Bund. skeleton long	13.50 to 13.75
Shafting	19.00 to 19.50
Cast bor. chemical	9.50 to 10.25
Per gross ton delivered consumers' yards:	
Textile cast	\$17.00 to \$19.00
No. 1 machine cast	18.00 to 19.00
Stove plate	10.00 to 10.50

CANADA

Dealers' buying prices at their yards, per gross ton	
Toronto Montreal	
No. 1 hvy. mltng. stl.	\$13.50 \$13.00
No. 2 hvy. mltng. stl.	12.50 12.00
Mixed dealers steel	12.00 11.75
Scrap pipe	10.25 9.75
Steel turnings	9.00 8.50
Cast borings	9.75 9.50
Machinery cast	17.50 17.00
Dealers cast	15.50 15.00
Stove plate	13.00 12.75

EXPORT

Dealers' buying prices per gross ton:	
New York, truck lots, delivered, barges.	
No. 1 hvy. mltng. steel. . . .	\$17.00
No. 2 hvy. mltng. steel. . . .	16.00
No. 2 cast	15.00
Stove plate	\$12.00 to 12.50
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel. . . .	\$17.50
No. 2 hvy. mltng. steel. . . .	16.50
Rails (scrap)	17.50
Stove plate	14.50
No. 2 cast	\$14.75 to 15.00
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel. . . .	\$19.00
No. 2 hvy. mltng. steel. . . .	18.00
New Orleans, f.a.s., Stuyvesant Dock	
No. 1 hvy. mltng. steel. . . .	\$17.50
No. 2 hvy. mltng. steel. . . .	16.50
Los Angeles, on cars or trucks at local piers	
No. 1 hvy. mltng. steel.	\$10.50 to \$11.00
Compressed bundles	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton
Rerolling\$37.00
Forging quality 43.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open-hearth or Besse-mer\$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared2.10c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton
F.o.b. Pittsburgh or Cleveland.....\$47.00
F.o.b. Chicago, Youngstown or Anderson, Ind. 48.00
F.o.b. Worcester, Mass. 49.00
F.o.b. Birmingham 50.00
F.o.b. San Francisco 56.00
F.o.b. Galveston 53.00
Rods over 9/32 in. to 47/64 in., inclusive, \$5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.
F.o.b. Pittsburgh 2.45c.
F.o.b. Chicago or Gary 2.50c.
F.o.b. Duluth 2.60c.
Del'd Detroit 2.60c.
F.o.b. Cleveland 2.50c.
F.o.b. Buffalo 2.55c.
Del'd Philadelphia 2.74c.
Del'd New York 2.78c.
F.o.b. Birmingham 2.60c.
F.o.b. cars dock Gulf ports... 2.85c.
F.o.b. cars dock Pacific ports... 3.00c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh 2.30c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill. 2.35c.
F.o.b. Buffalo 2.40c.
F.o.b. Birmingham 2.45c.
F.o.b. cars dock Gulf ports... 2.70c.
F.o.b. cars dock Pacific ports... 2.85c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.55c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.60c.
Del'd Detroit 2.70c.
F.o.b. cars dock Gulf ports... 2.95c.
F.o.b. cars dock Pacific ports... 2.95c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.40c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.45c.
F.o.b. cars dock Gulf ports... 2.80c.
F.o.b. cars dock Pacific ports... 2.80c.

Iron

F.o.b. Chicago 2.40c.
F.o.b. Pittsburgh (refined) 3.60c.

Cold Finished Bars and Shafting*

Base per Lb.
F.o.b. Pittsburgh 2.90c.
F.o.b. Cleveland, Chicago and Gary 2.95c.
F.o.b. Buffalo 3.00c.
F.o.b. Detroit 2.95c.

* In quantities of 10,000 to 19,999 lb.

Plates

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago or Gary 2.30c.
Del'd Cleveland 2.435c.
F.o.b. Coatesville or Spar. Pt. 2.35c.
Del'd Philadelphia 2.435c.
Del'd New York 2.53c.
F.o.b. Birmingham 2.40c.

F.o.b. cars dock Gulf ports.... 2.65c.
F.o.b. cars dock Pacific ports... 2.80c.
Wrought iron plates, f.o.b. Pittsburgh 3.80c.

Floor Plates

F.o.b. Pittsburgh 3.80c.
F.o.b. Chicago 3.85c.
F.o.b. Coatesville 3.90c.
F.o.b. cars dock Gulf ports.... 4.20c.
F.o.b. cars dock Pacific ports... 4.35c.

Structural Shapes

Base per Lb.
F.o.b. Pittsburgh 2.25c.
F.o.b. Chicago 2.30c.
Del'd Cleveland 2.435c.
F.o.b. Buffalo or Bethlehem... 2.35c.
Del'd Philadelphia 2.455c.
Del'd New York 2.5025c.
F.o.b. Birmingham (standard) 2.40c.
F.o.b. cars dock Gulf ports... 2.65c.
F.o.b. cars dock Pacific ports... 2.80c.

Steel Sheet Piling

Base per Lb.
F.o.b. Pittsburgh 2.60c.
F.o.b. Chicago or Buffalo 2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports 3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton\$42.50
Angle bars, per 100 lb. 2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton\$43.00
Light rails (from rail steel) per gross ton 42.00

Base per Lb.

Spikes 3.15c.
Tie plates, steel 2.30c.
Tie plates, Pacific Coast ports.. 2.40c.
Track bolts, to steam railroads. 4.35c.
Track bolts, to jobbers, all sizes (per 100 counts)

65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE,

TERNE PLATE

Sheets

Hot Rolled

Base per Lb.
No. 10, f.o.b. Pittsburgh 2.40c.
No. 10, f.o.b. Gary 2.50c.
No. 10, del'd Detroit 2.60c.
No. 10, del'd Philadelphia 2.69c.
No. 10, f.o.b. Granite City 2.60c.
No. 10, f.o.b. Birmingham 2.55c.
No. 10, f.o.b. cars dock Pacific ports 2.95c.
No. 10 wrought iron, Pgh.... 4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh 3.15c.
No. 24, f.o.b. Gary 3.25c.
No. 24, del'd Detroit 3.35c.
No. 24, del'd Philadelphia 3.44c.
No. 24, f.o.b. Granite City 3.35c.
No. 24, f.o.b. Birmingham 3.30c.
No. 24, f.o.b. cars dock Pacific ports 3.80c.
No. 24, wrought iron, Pitts-burgh 5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh... 3.10c.
No. 10 gage, f.o.b. Gary 3.20c.
No. 10 gage, f.o.b. Detroit 3.30c.
No. 10 gage, del'd Philadelphia. 3.39c.
No. 10, f.o.b. Granite City 3.30c.
No. 10 gage, f.o.b. Birmingham. 3.25c.
No. 10 gage, f.o.b. cars dock Pacific ports 3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh... 3.55c.
No. 20 gage, f.o.b. Gary 3.65c.
No. 20 gage, del'd Detroit 3.75c.
No. 20 gage, del'd Philadelphia. 3.84c.
No. 20, f.o.b. Granite City 3.75c.
No. 20 gage, f.o.b. Birmingham. 3.70c.
No. 20 gage, f.o.b. cars, dock, Pacific ports 4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh... 3.80c.
No. 24, f.o.b. Gary 3.90c.
No. 24, del'd Philadelphia 4.09c.
No. 24, f.o.b. Granite City 4.00c.

No. 24, f.o.b. Birmingham 3.95c.
No. 24, f.o.b. cars, dock, Pacific ports 4.40c.
No. 24, wrought iron, Pitts-burgh 6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.

Field grade 3.35c.
Armature 3.70c.
Electrical 4.20c.
Special Motor 5.10c.
Special Dynamo 5.80c.
Transformer 6.30c.
Transformer Special 7.30c.
Transformer Extra Special 7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.
Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh 4.10c.
F.o.b. Gary 4.20c.
F.o.b. cars, dock, Pacific ports 4.80c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh 3.50c.
No. 20, f.o.b. Gary 3.60c.
No. 20, f.o.b. Granite City 3.70c.
No. 20, f.o.b. cars dock Pacific ports 4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per lb. 3.30c.
No. 28, Gary 3.40c.
No. 28, f.o.b. Granite City 3.50c.
No. 28, cars dock Pacific ports, boxed 4.175c.

Tin Plate

Base per Box

Standard cokes, f.o.b. Pitts-burgh district mill\$5.35
Standard cokes, f.o.b. Gary... 5.45
Standard coke, f.o.b. Granite City 5.55

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

Special Coated Manufacturing Ternes

Per Base Box

F.o.b. Pittsburgh\$4.65
F.o.b. Gary 4.75
F.o.b. Granite City 4.85

* Customary 7½ per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)
8-lb. coating I.C.\$11.00
15-lb. coating I.C. 13.00
20-lb. coating I.C. 14.00
25-lb. coating I.C. 15.00
30-lb. coating I.C. 16.25
40-lb. coating I.C. 18.50

Hot-Rolled Hoops, Bands, Strip and

Flats under ¾ in.

Base per Lb.

All widths up to 24 in., Pitts-burgh 2.40c.
All widths up to 24 in., Chicago 2.50c.
All widths up to 24 in., del'd Detroit 2.60c.
All widths up to 24 in., Granite City 2.60c.
All widths up to 24 in., Birmingham 2.55c.
Cooperage stock, Pittsburgh... 2.50c.
Cooperage stock, Chicago 2.60c.

Cold-Rolled Strip*

Base per Lb.

F.o.b. Pittsburgh 3.20c.
F.o.b. Cleveland 3.20c.
Del'd Chicago 3.48c.
F.o.b. Worcester 3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

Pittsburgh

and

Cleveland Worcester

Carbon 0.25-0.50% 3.20c. 3.40c.
Carbon .51-.75 4.45c. 4.65c.
Carbon .76-1.00 6.30c. 6.50c.
Carbon Over 1.00 8.50c. 8.70c.

Fender Stock

No. 14, Pittsb'gh or Cleveland 3.45c.
No. 20, Pittsb'gh or Cleveland. 3.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

	Per Lb.
Bright wire	2.90c.
Spring wire	3.50c.
Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.	

To the Trade

	Base per Keg
Standard wire nails	\$2.75
Smooth coated nails	\$2.75
Cut nails, carloads	\$3.60

Base per 100 Lb.

Annealed fence wire	\$3.20
Galvanized fence wire	3.60
Polished staples	3.45
Galvanized staples	3.70
Barbed wire, galvanized	3.40
Twisted barless wire	3.40
Woven wire fence, base column. 74	
Single loop bale ties, base col....	63

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh, except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are 3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
1/8	52 31	1/8 & 3/8	+6 +26
1/4 to 3/8	55 38 1/2	1/2	27 10 1/2
1/2	59 49	3/4	32 16
3/4	62 53	1 & 1 1/4	35 21
1 to 3	64 55	1 1/2	39 23 1/2
		2	38 23

Lap Weld

2	57 47 1/2	2	32 1/2 18
2 1/2 & 3	60 50 1/2	2 1/2 to 3 1/2	33 1/2 20 1/2
3 1/2 to 6	62 52 1/2	4 to 8	35 1/2 24
7 & 8	61 50 1/2	9 to 12	28 1/2 15
9 & 10	60 50		
11 & 12	59 49		

In.	Butt Weld, extra strong, plain ends	In.	Wrought Iron Black Galv.
1/8	50 36 1/2	1/8 & 3/8	+7 +39
1/4 to 3/8	52 40 1/2	1/2	28 13
1/2	57 48 1/2	3/4	33 18
3/4	61 52 1/2	1 to 2	39 24 1/2
1 to 3	63 55		

In.	Lap Weld, extra strong, plain ends	In.	Wrought Iron Black Galv.
2	55 46 1/2	2	35 1/2 21 1/2
2 1/2 & 3	59 50 1/2	2 1/2 to 4	41 28 1/2
3 1/2 to 6	62 54	4 1/2 to 6	40 1/2 28
7 & 8	61 51	7 & 8	41 1/2 28 1/2
9 & 10	60 50	9 to 12	32 20 1/2
11 & 12	59 49		

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Cold Drawn	Hot Rolled
1 in. o.d.	13 R.W.G. \$ 9.16	\$ 8.41
1 1/4 in. o.d.	13 R.W.G. 11.21	9.96
1 1/2 in. o.d.	13 R.W.G. 12.38	11.00
1 3/4 in. o.d.	13 R.W.G. 14.09	12.51
2 in. o.d.	13 R.W.G. 15.78	14.02
2 1/4 in. o.d.	13 R.W.G. 17.60	15.63
2 1/2 in. o.d.	12 R.W.G. 19.37	17.21
2 3/4 in. o.d.	12 R.W.G. 21.22	18.87
3 in. o.d.	12 R.W.G. 22.49	19.98
3 1/4 in. o.d.	12 R.W.G. 23.60	20.97
3 1/2 in. o.d.	10 R.W.G. 45.19	40.15
3 3/4 in. o.d.	11 R.W.G. 29.79	26.47
4 in. o.d.	10 R.W.G. 36.96	32.83
5 in. o.d.	9 R.W.G. 56.71	50.38
6 in. o.d.	7 R.W.G. 87.07	77.35

	Extra for less-carload quantities:
25,000 lb. or ft. to 39,999 lb. or ft.	5 %
12,000 lb. or ft. to 24,999 lb. or ft.	12 1/2 %
6,000 lb. or ft. to 11,999 lb. or ft.	25 %
2,000 lb. or ft. to 5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.	50 %

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago.	\$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham.	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles....	56.00
F.o.b. dock, Seattle.....	56.00
4-in. f.o.b. dock, San Francisco or Los Angeles.....	59.00
F.o.b. dock, Seattle.....	59.00

Class "A" and gas pipe, \$3 extra.
4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$41, Birmingham, and \$49.50, delivered Chicago; and 4-in. pipe, \$44, Birmingham, and \$2.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVES, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
1/2 in. x 6 in. and smaller.	65 and 5*
Larger and longer up to	
1 in.	60 and 10*
1 1/2 in. and larger.....	60 and 5*
Lag bolts	60 and 10*
Flow bolts, Nos. 1, 2, 3	
and 7	65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex, blank or tapped:	
1/2 in. and smaller.....	65 and 5*
9/16 in. to 1 in. inclusive.	60 and 10*
1 1/2 in. and larger.....	60 and 5*

Jobbers discount on above items, 5 per cent.

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:

1/2 in. and smaller.....	60 and 20
9/16 in. to 1 in. inclusive.	60 and 15
1 1/2 in. and larger.....	60 and 12 1/2
Stove bolts in packages, nuts attached	72 1/2
Stove bolts in packages, with nuts separate	72 1/2 and 5
Stove bolts in bulk.....	81 1/2

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1/2-in. and larger)

Base per 100 Lbs.

F.o.b. Pittsburgh or Cleveland..\$3.60

F.o.b. Chicago or Birmingham.. 3.70

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh	70
F.o.b. Cleveland	70
F.o.b. Chicago and Birmingham..	70

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread 1/2 in. and smaller.....	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, \$60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base3.00c.
Delivered, Detroit

	Alloy Series	Differential
Numbers		per 100 lb.
200 (1/2% Nickel)		\$0.35
2100 (1 1/2% Nickel)		0.75
2300 (3 1/2% Nickel)		1.55

2500 (5% Nickel)	\$2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum) ..	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum) ..	0.75
4600 Nickel-molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel....	0.15
6100 Chromium-vanadium bar...	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium ...	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

	Chrome-Nickel	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes ..	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip ..	23.50c.	21.50c.
Cold-rolled strip ..	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars ..	18.50c.	19c.	22.50c.	27.50c.
Plates ..	21.50c.	22c.	25.50c.	30.50c.
Sheets ..	26.50c.	29c.	32.50c.	36.50c.
Hot strip ..	17c.	17.50c.	23c.	28c.
Cold stp. ..	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	67c.
H'gh-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c a lb. higher.

British and Continental BRITISH

Per Gross Ton

f.o.b. United Kingdom Ports

Ferromanganese, export	£15
Tin plate, per base box	24s. to 25s.
Steel bars, open-hearth.....	£11
Beams, open-hearth.....	£9 2s. 6d.
Channels, open-hearth.....	£10 12s. 6d.
Angles, open-hearth.....	£10 12s. 6d.
Black sheets, No. 24 gage	£13
Galvanized sheets, No. 24 gage	£16 15s.

CONTINENTAL

Per Metric Ton, Gold £, f.o.b. Continental Ports

Current dollar equivalent is ascertained by multiplying gold pound prices by 124.14 to obtain franc equivalent and then converting at present rate of dollar-france exchange.	
Billets, Thomas	£3 7s.
Wire rods, No. 5 B.W.G....	£4 10s.
Steel bars, merchant	£5
Sheet bars	£3 8s.
Plate 1/2 in. and up.....	£6 7s.
Plate 3/16 in. and 5 mm.....	£6 13s.
Sheet, 1/2 in.	£7 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£6

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Per Net Ton
Plates	3.70c.
Structural shapes	3.70c.
Soft steel bars and small shapes	3.80c.
Reinforcing steel bars	3.80c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$4.48
Spikes, large	1 to 24 kegs 3.90c.
	Per Cent Off List
Track bolts, all sizes, per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	\$4.35
Wire, black, soft ann'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg	3.00c.
Cement coated nails, per keg	3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

**Prices on application.

CHICAGO Base per Lb.

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	4.40c.
Track bolts (keg lots)	5.60c.
Rivets, structural (keg lots)	4.60c.
Rivets, boiler (keg lots)	4.70c.
	Per Cent Off List
Machine bolts	*60
Carriage bolts	*60
Lag screws	*55 and 5
Hot-pressed nuts, sq. tap or blank	*60
Hot-pressed nuts, hex. tap or blank	*60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	\$4.00 off list
Black ann'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	\$4.55
Com. wire nails, 15 kegs or more, per keg	\$3.20
Cement c't'd nails, 15 kegs or more, per keg	\$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. charcoal	6.50 to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.

Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.
Bands	4.32c.
Hot-rolled sheets (No. 10)	4.07c.
Hot-rolled ann'd sheets (No. 24*)	4.32c.
Galvanized sheets (No. 24*)	5.72c.
Long terme sheets (No. 24)	6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, ½ in. and heavier	5.90c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.35c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x ½ in. and larger	4.11c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	\$3.40

Per Cent Off List

Machine bolts, square head and nut:	
All diameters. Prices on application	
Carriage bolts, cut thread:	
All diameters. Prices on application	

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.
†125 lb. and more.

ST. LOUIS Base per Lb.

Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	4.94c.
Boiler rivets	5.04c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base Per Lb.
*Plates, ¼ in. and heavier	3.80c.
*Structural shapes	3.80c.
*Soft steel bars, small shapes, iron bars (except bands)	3.90c.
†Reinforc. steel bars, sq. twisted and deformed	3.21c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.25c.
*Steel bands, No. 12 and 3/16 in. incl.	4.00c.
Spring steel	5.40c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	3.90c.
Diam. pat. floor plates, ¼ in.	5.45c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.86c.

Soft steel bars	3.75c.
†Reinforc. steel bars	2.60c.
‡Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in. wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'd wire, per 100 lb.	\$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95
	Per Cent Off List
Machine and carriage bolts, small	65 and 5
Large	60 and 10
Nuts, 100 count	
½ in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 10

†Outside delivery 10c. less.

*For 5000 lb. or less.

‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI Base per Lb.

Plates and struc. shapes	3.95c.
Floor plates	5.85c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	\$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	55 per cent off list
No. 9 ann'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Com. wire nails, base per keg:	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb. keg	3.50
Chain. lin. per 100 lb.	8.35
	Net per 100 Ft.
Seamless steel boiler tubes,	
2-in.	\$21.80
4-in.	52.45
Lap-welded steel boiler tubes,	
2-in.	20.73
4-in.	48.41

BUFFALO Base per Lb.

Plates	3.92c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg (2500-lb lots or under)	\$3.26
Black wire, base per 100 lb. (Over 2500 lb.)	4.55c.

BOSTON Base per Lb.

Channels, angles	4.20c.
Tees and zeels, under 3"	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank and univ. mill, ¼ thick and heavier	4.08c.
Floor plates, diamond pattern	6.03c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.

Soft steel bars	3.94c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets	
(No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

* Under 400 lb., .50c. over base; 400 to 1499 lb. base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

Base per Lb.

Plates and structural shapes	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets	
(No. 24)	4.71c.
Galvanized sheets (No. 24)	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)	4.71c.
Boiler rivets, cone head (keg lots)	4.81c.
Track spikes (keg lots)	4.26c.
Track bolts (keg lots)	5.71c.
Black annealed wire (No. 6 to No. 9 incl.)	4.66c.
Com. wire nails and cement coated nails	
1 to 14 kegs	3.31c.

Per Cent Off List

Machine bolts and carriage bolts, 1/2x6 and smaller	65-10
Larger	65
Coach and lag screws	65
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	65

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

Base per Lb.

Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.85c.
Galvanized sheets, No. 24	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

Base per Lb.

Mild steel bars and small shapes	3.85c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons	3.11c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.80c.
Bands	3.85c.
Hoops	4.10c.
Special threading steel	3.95c.
Checkered floor plates 1/4 in. and heavier	5.90c.
Galvanized bars, bands and small shapes	6.35c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	\$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb. All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

Base per Lb.

Mild steel bars	3.96c.
Iron bars	3.96c.
Reinforcing bars	3.96c.
Structural shapes	4.01c.
Plates	4.01c.
Hot-rolled sheets No. 10	3.91c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.16c.
Cold-finished bars	4.86c.

* Plus mill item extra.

MEMPHIS

Base per Lb.

Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	4.35c.
Boils and nuts, per cent off list	55
Small rivets, per cent off list	60

NEW ORLEANS

Base per Lb.

Mild steel bars	4.20c.
Reinforcing bars	3.14c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.10c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	\$3.30
Boils and nuts, per cent off list	65

PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports	2.975c.	2.975c.	3.625c.
Hot-rolled annealed sheets (No. 24)	5.15	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel			
Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	\$3.65	\$3.60	\$3.70

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works

First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	\$54.00
First quality, New Jersey	56.00
Select, Ohio	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	49.00
Second quality, New Jersey	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton	8.00
5 per cent trade discount on fire clay brick.	

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$54.00
Chicago District	63.00
Birmingham	54.00
Silica cement per net ton (Eastern)	9.50
5 per cent trade discount on silica brick.	

Chrome Brick

Per Net Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester	\$49.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	49.00

Magnesite Brick

Per Net Ton

Standard f.o.b. Baltimore and Chester, Pa.	\$69.00
Chemically bonded, f.o.b. Baltimore	59.00

Grain Magnesite

Per Net Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash.	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.27
Delivered Newark or Jersey City	26.39
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.07
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	21.00
Delivered San Francisco, Los Angeles or Seattle	25.00
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.51
Delivered Canton, Ohio	24.76
Delivered Mansfield, Ohio	25.26
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	\$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.39
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago.	24.50
F.o.b. Birmingham	25.50
Delivered Cincinnati	25.51
Delivered Canton, Ohio	25.76
Delivered Mansfield, Ohio	26.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. \$28.50

Gray Forge

Valley or Pittsburgh furnace...\$23.50

Charcoal

Lake Superior furnace \$27.00
Delivered Chicago 30.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	\$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Per Gross Ton	
Domestic, 80% (carload)	\$95.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$30.00
F.o.b. New Orleans	30.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 6.00 to 6.50%	\$28.50

For each additional 0.5% silicon up to 17%.

50c. a ton is added.
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.
Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace	
Per Gross Ton	
10.00 to 10.50%	\$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	\$1.70
Ferrotungsten, lots of 5000 lb.	1.75
Ferrotungsten, smaller lots	1.80
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.50c.
Ferrocromium, 2%	16.50c. to 17.00c.
Ferrocromium, 1%	17.50c. to 18.00c.
Ferrocromium, 0.10%	19.50c. to 20.00c.
Ferrocromium, 0.06%	20.00c. to 20.50c.
Ferrovandium, del. per lb. contained V.	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50
Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$142.50
Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$45.00
Ton lots or less, per ton	50.00
Silico-manganese, gross ton, delivered.	
3%	95.00
2.50% carbon grade	100.00
2% carbon grade	105.00
1% carbon grade	115.00

Note: Spot prices are \$3 a ton higher except on 75 per cent ferrosilicon on which premium is \$10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports	
Per Gross Ton	
Old range, Bessemer, 51.50%	\$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10

Mesabi, non-Bessemer, 51.50%...\$4.95
High phosphorus, 51.50%..... 4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit	
Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68 1/2% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	Nominal
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed	
52%	45c.
Man., African, Indian, 44-48%	Nominal
Man., African, Indian, 49-51%	Nominal
Man., Brazilian, 46 to 48 1/2%	Nominal

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	\$22.00 to \$24.00
Tungsten, domestic, scheelite delivered	Nominal
Chrome ore (lump) c.i.f. Atlantic Seaboard, per net ton:	
South African	\$16.00
Rhodesian, 45%	23.00
Rhodesian, 48%	25.00
Turkish, 48-49%	24.50 to \$25.00
Turkish, 45-46%	20.50 to 21.00
Turkish, 44%	19.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
52%	\$25.50 to \$26.00
50%	24.50
48-49%	24.50 to 25.00

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$19.00 to \$20.00
Domestic, barge and rail	19.50 to 21.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	20.00 to 21.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial	4.35c.
Del'd Ch'go, No. 5 industrial	3.90c.
Del'd Cleve'd, No. 3 distillate	6.00c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

COKE AND COAL

Coke	Per Net Ton
Furnace, f.o.b. Connellsville, Prompt	\$4.60 to \$4.75
Foundry, f.o.b. Connellsville, Prompt	5.25 to 6.50
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.85 to 11.30
Foundry, by-product, Philadelphia	10.60
Foundry, by-product, delivered Cleveland	11.00
Foundry, by-product, delivered Cincinnati	10.50
Foundry, by-product, del'd St. Louis industrial district	11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75
Coal	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, 3/4-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

FOR *High Quality Steels*

NIAGARA

BRAND

FERRO-ALLOYS

FERRO SILICON

ALL GRADES

FERRO CHROMIUM

HIGH CARBON

FERRO CHROMIUM

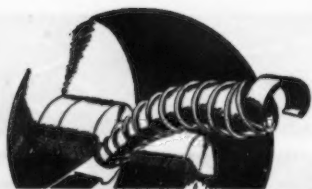
LOW CARBON

FERRO MANGANESE

SILICO MANGANESE

£

**PITTSBURGH
METALLURGICAL CO., Inc.**



THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... Orders and inquiries at high level in most centers.

o o o

... Automobile and farm implement makers actively in the market.

o o o

... Shortage of skilled men a factor in extending deliveries on machinery.

Pittsburgh

ORDERS continue their upward trend, and there is already evidence that this month's business will be ahead of March. There appears to be an acceleration in the movement to replace obsolete machinery. Running concurrent with this factor is the absolute necessity for new machine tools to take care of the increasing volume of customer business. There is no doubt that the continued shortage of skilled workmen and the upward movement of labor costs constitute factors which will play considerable part in the ordering of machine tool equipment for some time to come. Meanwhile, dealers are literally swamped with inquiries. On items for which delivery is four months or more, many manufacturers are stipulating that the prevailing price will be that existing 30 days before shipment or in some cases at the time of shipment. Guarantees have been made also that if a price advance is made it will not be above a certain per cent, depending upon the machine and the manufacturer.

New York

SPECIFICATIONS have been particularly heavy in the past week because of orders placed before the expiration of the 10-day period of grace following the announcement of recent price advances. Especially active are sellers of lathes and millers. Although this current rush of orders may be termed speculative, it is certain that in every instance the tools are badly needed, and, since deliveries as late as October will not be uncommon, additional orders will probably be placed before shipment is obtained on those now on the books. Two of the largest Eastern buyers, American Locomotive Co. and General Electric Co., are still not buying up to their 1929 boom levels, although the former has spent about

\$250,000 so far this year with one company alone. Deliveries are more extended, however, even though volume of business is not so great as in the 1929 period, because of the great scarcity of skilled workers. One seller does not believe this condition will be remedied soon because of a tendency for the young men of today to prefer other types of work. The supply of second-hand tools is still exhausted, and some companies seem to be using their present equipment almost to the wearing-out point before replacement.

Cincinnati

MODERATE increase in automotive retooling the past week added vigor to an already active machinery market. Car builders, apparently releasing reequipment programs, were in the market for millers, grinders, lathes and broachers. Among the orders were several multiple-unit requisitions. The general demand appears to be well sustained for all types of tools, and local plants have well-filled order books. In fact, the problem of new business is not as disturbing as the question of delivery. Shipping dates are being extended.

Production schedules are at factory limits, although in some instances a shortage of skilled labor is restricting full output.

Cleveland

MACHINE tool sales by local distributors are only fair. Orders are mostly for single machines in the smaller sizes and are coming from scattered sources. Buyers shop around and usually buy from the dealer who can make the best delivery. Business with manufacturers continues good and deliveries of some lines are becoming more extended. A leading manufacturer of turret lathes is now about sold up for the third quarter on its larger size machines.

Foreign inquiry continues brisk. One manufacturer of turret lathes has exhausted for the year the quota of machines allocated for export. New inquiries include one from France for 36 such machines.

Chicago

APRIL sales are well up to the average of the year to date and there is a good flow of fresh inquiries. Business is coming from all directions and none of it is large as gaged by the number of machine tools being taken by any one source. Farm implement and tractor plants are buying and some of them indicate that larger programs are on the way. The railroads are still buying and there is interest in special equipment on the part of car shops. Prices continue to move up, a line of lathes having been marked 10 per cent higher on April 20.

Detroit

THE delivery situation is so acute that several important buyers have been forced to pick out rebuilt equipment and figure next year's production around that. It has been reported in the last week that Chrysler is looking around for used machinery for its proposed expansion in its Windsor plant. Likewise, the desire for speed in the programs at the new diesel engine division of General Motors and in the Cadillac sixteen cylinder car, has caused machinery buyers to hunt for machines that can be changed over quickly. G.M., incidentally, is now starting work on its new plant for diesels at the Pere Marquette Railroad and Outer Drive. In some cases, machine deliveries are extended into September. It is this that accounts for the search for fill-in equipment. In the rebuilding business, orders are booked so far ahead that it is impossible to get a job touched in less than three weeks.

Summer Engineering Conference to Be Held

THE summer conference on the teaching of mechanical engineering will be held in Cambridge, Mass., June 28 and 29, under the auspices of the mechanical engineering division of the Society for the Promotion of Engineering Education. Harvard University and Massachusetts Institute of Technology will act as host institutions. Prof. Frank L. Eidmann, professor of mechanical engineering, Columbia University, is chairman of the conference.

Discussions will be held on the advances and trends in the teaching of heat engineering, experimental mechanical laboratory, machine design and related subjects, heat treating and metallurgy, hydraulics and fluid mechanics, and the selection of materials for engineering projects.



PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Superintendent of Lighthouses, St. George, Staten Island, New York, asks bids until May 3 for 10 to 20 magnetic antenna switches (Proposal 53608); until May 5, 14 steel gas buoys, from 9 ft. diameter and 32 ft. long to 7 ft. diameter, and 18 ft. long, with bells, skeleton lantern towers and bottom counterweights (Proposal 53568).

Fleer & Fleer, Inc., Bond and First Streets, Brooklyn, oils, coal, etc., has plans for new bulk oil storage and distributing plant at foot of Bay Street, with steel storage tanks, pumping station and other facilities. Cost over \$100,000 with equipment. Edward M. Wharff, 489 Fifth Avenue, New York, is consulting engineer.

Department of Sanitation, City of New York, 125 Worth Street, New York, has filed plans for two-story service, repair and garage building, 139 x 200 ft., for department trucks and cars, at 5514-30 Nineteenth Avenue, Brooklyn. Cost about \$150,000 with tools and equipment. Harrison & Foulhoux, 45 Rockefeller Plaza, New York, are architects.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until May 3 for lead-covered, armored steel wire, 10-pair, in lots of 12,000 to 39,000 ft. (Circular 160); until May 14, self-supporting, insulated steel radio towers, 125 ft. high, in lots of 40 to 75 (Circular 161).

Edwin B. Stimpson Co., 68 Franklin Avenue, Brooklyn, manufacturer of metal specialties, operating Stimpson Eyelet & Rivet Machine Co., same address, has let general contract to Caye Construction Co., Inc., Clarkson Avenue and East Forty-third Street, for new two-story plant, 87 x 97 ft. Cost about \$60,000 with equipment. Allmendinger & Schlendorf, 356 Fulton Street, are architects.

Solar Mfg. Corp., 599 Broadway, New York, manufacturer of radio condensers, radio parts, etc., has leased former mill of S. J. Aronson Silk Co., Twenty-third Street and Avenue A, Bayonne, N. J., about 48,000 sq. ft. floor space, and will improve for main plant.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 4 for 120 cutting hand oxyacetylene torches and 108 welding oxyacetylene torches (Schedule 566), two motor-driven diesel fuel oil purifiers and two sets of control appliances and spare parts (Schedule 491) for Brooklyn Navy Yard; until May 11, hack saw blades (Schedule 555) for Brooklyn and Mare Island yards; 7040 sheet steel dust pans (Schedule 547) for Brooklyn, Sewall's Point and Mare Island yards; 931 pairs of tinnern's shears and 936 pairs of sailmakers' shears (Schedule 548) for Brooklyn, Sewall's Point and Mare Island yards.

Continental Can Co., 100 East Forty-second Street, New York, plans new branch plant at St. Laurent, Que., where seven-acre tract has been acquired. Cost close to \$175,000 with equipment. Plant will be operated by Continental Can Co. of Canada, Ltd., New Toronto, Ont., Canadian subsidiary.

Wright Aeronautical Corp., 1120 East Nineteenth Street, Paterson, N. J., manufacturer of aircraft engines and parts, will carry out expansion by erection of main four-story addition, 65 x 205 ft., recently noted in these columns, one-story addition to assembling division, and two one-story extensions to testing division, latter to accommodate engine units up to 2500-hp. Cost about \$1,350,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until May 3 for one testing machine (Circular 754).

Harrisburg Coca-Cola Co., 318 Carlisle Street, Harrisburg, Pa., has plans for new

two-story plant, 100 x 175 ft., at Holly and Seventeenth Streets, with one-story garage adjoining for company trucks. Cost close to \$100,000 with equipment.

Purchasing and Contracting Officer, Quartermaster Depot, Middletown Air Port, Middletown, Pa., asks bids until May 12 for two electric-driven gasoline pumps (Proposal 562-20).

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until May 3 for two annealing pots (Circular 620); until May 4, one caliber 0.50 bullet-pointing and assembling machine (Circular 597); until May 5, one vertical spindle, motor-driven surface grinder (Circular 625), 13 semi-automatic pivot burnishing machines (Circular 605).

◀ BUFFALO DISTRICT ▶

Lake Erie Foundry Co., 218 Chicago Street, Buffalo, manufacturer of gray iron castings, has let general contract to George J. Summers & Co., Inc., 1266 Seneca Street, for one-story addition. Cost about \$45,000 with equipment.

National Automotive Fibre Co., Little Falls, N. Y., manufacturer of automobile specialties, has plans for expansion and improvements, including modernization of existing structures, addition and installation of equipment. Cost close to \$150,000 with machinery. Main offices of company are at Oakland, Cal.

Eastman Kodak Co., Kodak Park, Rochester, N. Y., has plans for eight-story and basement addition, 60 x 125 ft., for which superstructure will begin in 30 to 60 days. Cost over \$200,000 with equipment.

◀ NEW ENGLAND ▶

Bead Chain Mfg. Co., Mountain Grove Street, Bridgeport, Conn., manufacturer of copper, chromium-plate and other metal bead chains, has let general contract to Aberthaw Co., 80 Federal Street, Boston, for one-story top addition to present three-story plant, 60 x 123 ft., and four-story wing extension, 20 x 60 ft. Cost close to \$100,000 with equipment. Walter J. Skinner, Bridgeport, is architect.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until May 7 for one automatic flash welding machine, three sets of blank dies and jaws for general purpose welding, and three sets of dies and jaws for welding component (Circular 209), one universal thread milling machine (Circular 210), one plain tool and cutter grinder (Circular 211); until May 17, one power factor correcting capacitor (Circular 219).

Vulcan Radiator Co., Francis Avenue, Hartford, manufacturer of steam and hot water radiators, has plans for two-story addition, 100 x 100 ft., and improvements in present plant. Cost over \$85,000 with equipment. J. E. Kane, 54 Church Street, is architect.

Hershey Metal Products Co., Derby, Conn., manufacturer of screw machine products, dies, stampings, etc., has let general contract to Eastern Construction Co., 149 Temple Street, New Haven, Conn., for one-story addition, 54 x 65 ft. Cost close to \$40,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 4 for 75 pneumatic scaling hammers (Schedule 536) for Boston and Brooklyn Navy Yards; until May 11, 396 hand drills (Schedule 538) for Boston, Brooklyn and Puget Sound yards; until May 14, seven stencil-cutting machines (Schedule 584) for Boston and Mare Island yards.

◀ WASHINGTON DIST. ▶

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until May 11 for 117 machinists' vises, 18 blacksmiths' anvils and seven air forges

(Proposal 398-121), 39 twin-post pneumatic lifts, bus and truck type (Proposal 398-126); until May 12, three motor-driven universal woodworking machines, three band-saws, jointer, saw table, motor-driven shaper and borer (Proposal 398-130).

General Purchasing Officer, Panama Canal, Washington, asks bids until May 3 for one 7500-lb. automobile hydraulic lift elevator, one motor-driven automobile and truck brake drum lathe and grinder, 42,000 ft. of plow steel wire rope, 29,000 ft. of wire rope, 1000 ft. steel wire rope, 13,800 lb. soft steel wire, bridge reamers, chucking reamers, hand reamers, hand taps, files and rasps, pipe and monkey wrenches, machinists' bench vises, tinnern's snips, hand shovels, etc. (Schedule 3243); until May 4, one 20-ton steam locomotive crane, one electric arc welding and air compressor set, gasoline or diesel engine-driven; two electric arc welding sets, motor driven, or gasoline or diesel engine-driven; two double-suction motor-driven pumps (Schedule 3248).

Glenn L. Martin Co., Middle River, Baltimore, manufacturer of aircraft and parts, has asked bids on general contract for one-story addition, 300 x 450 ft., primarily for assembling, and several smaller units. Cost about \$2,000,000 with equipment. Albert Kahn, Inc., Detroit, is architect and engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 4 for seamless copper tubing (Schedule 494), copper nickel alloy tubing (Schedule 495) for Portsmouth and Mare Island yards; one two-ton electric chain hoist and spare parts (Schedule 492), one electric truck revolving crane, complete with lead battery (Schedule 467); until May 11, hack-saw frames (Schedule 541), electric soldering iron (Schedule 533), electric drills and grinders (Schedule 518), screw drivers (Schedule 570), steel bolts and nuts (Schedule 557), galvanized conduit pipe (Schedule 564) for Eastern and Western yards.

◀ WESTERN PA. DIST. ▶

Erie Foundry Co., 1253 West Twelfth Street, Erie, Pa., manufacturer of steam hammers and parts, gray iron castings, etc., has let general contract to J. C. Hammond, 224 Lincoln Avenue, for one-story addition, 100 x 160 ft. Cost over \$70,000 with equipment.

Pennsylvania Power Co., Youngstown, has acquired about 44 acres at West Pittsburgh, near New Castle, Pa., for new steam-electric generating plant for power service in western Pennsylvania, work to begin in 30 to 60 days. Cost close to \$3,000,000 with transmission lines.

Corry-Jamestown Mfg. Corp., West Main Street, Corry, Pa., manufacturer of steel office furniture, filing cabinets and other steel equipment, has plans for three-story addition, 45 x 85 ft. Cost over \$65,000 with equipment.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has approved plans for three-story addition to engineering building at branch plant at Sharon, Pa. Cost about \$60,000 with equipment.

◀ SOUTH CENTRAL ▶

Continental Oil Co., Ponca City, Okla., plans new casing head gas recovery plant at Lake Charles, La., for production of natural gasoline, with steel tank storage and distributing division, power house, compressor station and other units. Cost about \$200,000 with equipment. Company also plans new oil recovery plant at oil well properties in Bastile oil field, Acadia Parish, La., including pumping station, power house and other mechanical departments. Cost close to \$225,000 with equipment.

Compressed Industrial Gases, Inc., 221 North La Salle Street, Chicago, has approved plans for new nitrogen, oxygen and acetylene plant on three-acre tract at Bossier City, La., recently acquired, comprising main one-story unit, 75 x 120 ft., and smaller structures, with steel tanks for storage and distribution. Cost over \$100,000 with equipment. T. L. Bramblett, now in charge of branch plant at Tyler, Tex., will be manager at Bossier City works. Plans also are under way for similar plants of smaller capacity near Shreveport and Monroe, La., where sites are being secured. R. C. Everson is company engineer in charge.

Richwood Distilling Co., Milton, Ky., recently organized, has taken over former Richwood Distillery, inactive for many years, and will remodel for new plant. New

buildings will be erected, with storage and distributing facilities. Cost about \$80,000. Michael L. Virga is president.

◀ SOUTH ATLANTIC ▶

Pepsi-Cola Bottling Co., 309 South Street, Durham, N. C., plans one-story addition, 55 x 108 ft., for expansion in mechanical-bottling division. Cost close to \$50,000, of which more than one-half will be expended for equipment. M. B. Burnette is general manager.

City Council, Kinston, N. C., plans extensions and improvements in municipal electric power plant, including new equipment. A bond issue of \$75,000 has been authorized for work.

F. C. Todd, Inc., Gastonia, N. C., manufacturer of textile mill equipment, has acquired part of former Ozark Building, and will remodel for new plant unit, with departments for production of cotton mill machinery and parts, gears and other mechanical specialties.

◀ SOUTHWEST ▶

United States Engineer Office, Court and Custom House, St. Louis, asks bids until May 15 for one locomotive crane for Dam 26, Alton, Ill.

Carter Carburetor Corp., 2834 North Spring Street, St. Louis, has let general contract to Austin Co., Arcade Building, for three-story addition, 60 x 180 ft. Cost close to \$100,000 with equipment.

Skelly Oil Co., Skelly Building, Tulsa, Okla., plans new works for production of natural gasoline in Panhandle oil field in northern Texas, where large tract has been acquired. Plant will include compressor station, power house and other mechanical structures, steel tank storage and distributing division. Cost over \$200,000 with equipment.

Bright Biscuit Co., 1402 West Thirteenth Street, Kansas City, Mo., manufacturer of food products, has arranged with Kansas City Industrial Land Co., Fairfax Industrial District, for erection of one-story and basement plant, 100 x 500 ft., in Fairfax Industrial District. Baking division will include traveling ovens, conveyers and other mechanical-handling equipment. General construction has been let to E. L. Winn Construction Co., Railway Exchange Building. Cost over \$175,000 with equipment. Charles E. Keyser, 609 Minnesota Avenue, Kansas City, Kan., is architect.

Contracting Officer, Quartermaster Office, Fort Riley, Kan., asks bids until May 4 for wrenches, hammers, pliers, socket sets, punch and chisel, machinist's vise, files, 7½-ton automobile jack, air compressor, 6000-lb. truck hoist, oil gun sets, valve seat grinders and other tools and equipment (Proposal 735-64).

Refugio Refining Co., Refugio, Tex., plans new natural gasoline plant in La Blanco oil and gas field, near Edinburg, Hidalgo County, Tex., with power house, compressor station, steel tanks and other structures. Cost close to \$100,000 with equipment. Capacity of initial plant will be increased later.

United States Engineer Office, Eighth Corps Area, Fort Sam Houston, Tex., asks bids until May 5 for one vertical type plate-coating machine, maximum, 29 x 36 in. (Circular 2).

◀ MICHIGAN DISTRICT ▶

Olds Motor Works, Lansing, Mich., a division of General Motors Corp., has asked bids on general contract for one-story addition, primarily for storage and distribution. Site is now occupied by another building, which will be razed. Cost about \$400,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Imperial Beverage Co., Kalamazoo, Mich., has plans for new two-story and basement plant, primarily for mechanical-bottling, with part for storage and distribution, and office. Cost close to \$50,000 with equipment. Stewart-Kingscott Co., Kalamazoo, is architect.

Eugene D. Kirkby, 1928 Buhl Building, Detroit, attorney, representing a local syndicate, recently formed, is concluding purchase of about 350-acre tract in Arenac County, near National City, Mich., for new plant for manufacture of gypsum products. A company is being formed, capitalized at \$1,500,000, to build and operate plant, which will consist of one and multi-story units, with power house, pumping station, ma-

chine shop and other mechanical structures. Work is scheduled to begin early in the summer. Cost close to \$750,000 with equipment.

◀ OHIO AND INDIANA ▶

Moraine Products Co., East First Street, Dayton, Ohio, manufacturer of bearings, bushings and kindred automobile products, a unit of General Motors Corp., has plans for new one-story plant, including office building. Cost about \$450,000 with equipment. Company is now occupying part of works of Delco Products Corp., manufacturer of shock absorbers and allied specialties, an affiliated interest, and will remove entire facilities to new plant on completion, vacated space to be used by Delco company.

Dover Appliance Co., Dover, Ohio, manufacturer of mechanical specialties, plans expansion and improvements, including modernization of existing buildings and equipment. Cost close to \$50,000.

Mining Machinery Mfg. & Sales Co., Massillon, Ohio, manufacturer of coal-mining machinery and other equipment, has acquired property at Painesville, Ohio, formerly used by Bronze Powder Co., for new main works. Company will remove plant from first noted place and install additional equipment. J. S. Alban, Painesville, will be manager at new works.

Board of Education, 121 Southard Avenue, Toledo, Ohio, asks bids on general contract until May 5 for two and three-story vocational high school, 96 x 490 ft., at Monroe and Sixteenth Streets, to include 24 shop units. Cost close to \$1,600,000 with equipment. Edwin M. Gee is architect for board; R. S. Wenzlau is director of schools.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until May 3 for one vertical electric furnace for carburizing and heat treatment (Circular 668); until May 4, steel tape armored cable (Circular 681), 10 electric-operated, high-pressure oil pump assemblies (Circular 678), transmitter and indicator assemblies (Circular 680); until May 10, six flow meter indicator assemblies, 20 flow meter metering unit assemblies and three dynamometer assemblies (Circular 679); until May 17, three generator assemblies (Circular 674).

Kaunell Trailer Mfg. Co., care of Vincennes Industrial Foundation, Vincennes, Ind., Joseph W. Kimmell, chairman, has arranged with last-noted organization to build one-story plant on tract near city, vicinity of Kelso Creek, for production of motor trailers, including parts manufacturing and assembling departments. Cost close to \$65,000 with equipment. Schucker & Bixby, Bayard Building, are architects.

Thompson Products Co., Inc., Cleveland, manufacturer of bolts, valves, etc., has acquired, through an exchange of stock, Jadson Motor Products Co., Bell, Cal., manufacturer of valves and other motor parts. Latter company will be continued as a subsidiary under same name.

◀ MIDDLE WEST ▶

All-Steel Equipment Co., Aurora, Ill., manufacturer of steel office furniture and industrial equipment, has asked bids on general contract for one-story addition, 80 x 180 ft. Cost over \$70,000 with equipment.

Bureau of Public Buildings, Treasury Department, Washington, will take bids soon on general contract for two and three-story post office service, repair and garage building at Canal, Polk and Clinton Streets, Chicago, for department motor trucks and cars. Third floor will be equipped primarily for machine and repair shops, with parts division. Cost over \$2,000,000 with equipment.

Board of Public Works, Fremont, Neb., asks bids soon for extensions and improvements in municipal electric power plant, including new equipment. Cost about \$300,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers. E. M. Hill is secretary of board.

Bureau of Reclamation, Custom House, Denver, asks bids until May 4 for one centrifugal-type motor-driven fan unit, capacity 10,000 cu. ft. per min., and for one combination motor-starting switch (Proposal B-23290-A).

Excel Projector Corp., 4234 West Drummond Street, Chicago, manufacturer of motion picture machines and parts, projection equipment, etc., has let general contract to Morris Handler Co., Inc., 2718 West Chicago Avenue, for one-story and basement addition, 125 x 150 ft. Cost close to \$70,000 with equipment.

Mankato Brewing Co., Rock Street, Mankato, Minn., will begin superstructure soon for three-story and basement mechanical-bottling unit, 60 x 75 ft. General contract was let recently to Neitge Construction Co., 641 Park Avenue. Cost close to \$50,000 with equipment.

A. Finkl & Sons Co., 2011 North Southport Avenue, Chicago, manufacturer of forgings and other mechanical products, has plans for one-story top addition to present one-story forge shop, 20 x 83 ft. Cost about \$35,000 with equipment. Morton L. Pereira & Associates, 100 West Monroe Street, are architects.

Public Utility Commission, Owatonna, Minn., W. J. McDonnell, secretary, asks bids until May 5 for turbo-generating unit, surface condenser and auxiliaries, and cooling tower for municipal electric power plant. Hitchcock & Estabrook, Inc., Sexton Building, Minneapolis, is consulting engineer.

Footo Bros. Gear & Machine Corp., 5301 South Western Boulevard, Chicago, has been awarded contract for operating machinery and equipment for first unit of Atlas Maltng Co. malt house in Bay City, Mich. Capacity of first unit will be 3,000,000 bu. per year. George Construction Co., Detroit, is general contractor.

◀ PACIFIC COAST ▶

Pacific Pump Works, 5615 Bickett Street, Huntington Park, Los Angeles, has plans for one-story addition, 60 x 160 ft. Cost over \$50,000 with equipment. W. M. Bosstock, 6221 Pacific Boulevard, Huntington Park, is engineer.

Henry J. Kaiser Co., Lathan Square Building, Oakland, Cal., paving materials, has plans for new works for manufacture of wet-mix concrete, including storage and distributing building, machine shop and other structures. Cost close to \$80,000 with machinery.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 4 for seamless steel tubing (Schedule 496) for Mare Island and Portsmouth yards; turbo-generator sets (Schedule 440); until May 7, plow steel wire rope (Schedule 520); until May 11, one set of balancing rolls, two rolls to set, complete with rolls and roll-bearing brackets, spring blocks, and vibrating supports, capacity 200 to 10,000 lb., and for similar set of balancing rolls, capacity 10,000 to 60,000 lb. (Schedule 562); until May 14, 19,000 lb. admiralty metal condenser tubes (Schedule 579) for Mare Island yard; steel valves (Schedule 573) for Puget Sound yard; until May 7, parts for airplanes (Schedule 900-765) for San Diego Naval Air Station.

Amalgamated Sugar Co., Ogden, Utah, has plans for new beet sugar mill at Nyssa, Ore., comprising one and multi-story buildings for main refinery, storage and distributing buildings, raw material storage, power house, pumping station, machine shop, and other structures. Cost close to \$20,000 with equipment.

B. F. Goodrich Co., 5400 East Ninth Street, Los Angeles, automobile tires and other rubber goods, plans one-story addition, 40 x 320 ft. Cost over \$100,000 with equipment. William Mellema, 1661 Beverly Boulevard, is architect and engineer.

Los Angeles Harbor Department, 638 Beacon Street, San Pedro, Los Angeles, has asked bids on general contract for one-story machine shop and testing laboratory at Berth 161, Los Angeles Harbor. Cost over \$50,000 with equipment.

◀ FOREIGN ▶

Adelaide Oil Exploration Co., Ltd., Adelaide, Australia, has authorized plans for new oil refinery on Island of Tasmania, to include an oil shale retort unit, cracking plant for gasoline production, steel tank storage and distributing facilities, power house and other units. Cost over \$500,000 with equipment. TVP Corp., 100 East Forty-second Street, New York, a subsidiary of Petroleum Conversion Corp., same address, is engineer and architect for project.

K. K. Tekkosa, Ltd., Tokyo, Japan, manufacturer of iron and steel products, is organizing a subsidiary with capital of 7,000,000 yen (about \$1,990,000), to build a plant for production of caustic soda, calcium carbide, synthetic acetic acid and kindred chemical products. It will be located in Sakata, Yamagata Province, where company has acquired property, and will comprise one and multi-story units with power house and machine shop. Cost over \$750,000 with equipment.

Alloying Cupola Gray Cast Iron

(CONTINUED FROM PAGE 45)

material contains 92 per cent nickel and 6 per cent silicon. The pure nickel melts at 2640 deg. F. and contains 99.65 per cent nickel.

Nickel pigs weighing 5 lb. are ordinarily used in producing Ni-Resist castings. The pigs are added to the cupola and contain 58 per cent Ni, 24½ per cent copper and 8 per cent chromium, with smaller amounts of silicon, carbon and manganese, melting at 2300 deg. F. It is recommended that 27½ per cent of this nickel pig be used in making Ni-Resist cast iron which contains approximately 14 per cent Ni, 6 per cent copper and 2 per cent chromium. Nickel recovery in cupola or ladle is usually over 95 per cent.

Several grades of nickel and chromium bearing pig are extensively used to introduce Ni into the mixture. One grade contains approximately 1.10 per cent Ni, 2.20 chromium and ordinary silicon. Another grade is produced with nickel over 1 per cent, chromium over 2 per cent, silicon 9 to 12 per cent with 2.50 per cent carbon. This pig is, of course, charged into the cupola in the usual manner.

Nickel has a graphitizing effect, reducing the tendency to chill and increase machineability when used in small percentages, but tends towards hardness if over 5 per cent. Nickel promotes freedom from porosity and uniformity of grain. Silicon is usually lowered when nickel is used. Various combinations of nickel, chromium and molybdenum are quite universally in use to produce improvements in strength, wear, impact, abrasion, corrosion, density, and heat resistance.

Silicon

The properties imparted to cast iron by silicon additions are well known and no effort is made here to elaborate on the subject.

Silicon is added to cast iron in the cupola, spout or ladle. It is added in many forms such as 50 to 80 per cent ferro-silicon, pig iron, briquets and silico-spiegel.

For cupola additions silicon briquets containing 1 or 2 lb. of silicon per briquet may be used. High silicon pig iron, or ferro-

TABLE III
Approximate Weight of Alloy Required for Each 100 lb. of Metal

Alloy, Per Cent Desired in Casting	Ferro- Chromium, 70 Per Cent		Copper, 99 Per Cent		Ferro- Molybde- num, 65 Per Cent		Ferro- Manganese, 80 Per Cent		Ferro- Silicon, 50 Per Cent		Nickel "F", 92 Per Cent	
	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.	lb.	oz.
0.20.....	..	5	..	3	..	5	..	6	..	8	..	3
0.30.....	..	7	..	5	..	8	..	7	..	10	..	5
0.40.....	..	9	..	6½	..	11	..	9	..	13	..	7
0.50.....	..	11	..	8	..	14	..	12	..	1	..	9
0.60.....	..	14	..	10	..	1	..	15	..	1	..	11
0.70.....	1	1	..	12	1	3	1	1	1	7	..	13
0.80.....	1	3	..	14	1	6	1	2	1	11	..	15
1.00.....	1	8	1	..	1	10	1	3	2	..	1	1
1.25.....	1	13	1	4	2	..	1	5	2	8	1	5
1.50.....	2	2	1	8	..	..	1	14	3	..	1	10
1.75.....	2	8	1	12	..	..	2	6	3	8	1	15
2.00.....	2	14	2	..	..	..	2	12	4	..	2	3
2.25.....	3	4	2	4	..	..	3	2	4	8	2	7
2.50.....	3	9	..	..	..	..	3	8	5	..	2	11
2.75.....	3	14	..	..	..	..	4	..	5	8	3	..

silicon are quite generally used, also.

Ladle additions should be made with either 50 or 80 per cent ferro-silicon crushed to ½-in. This

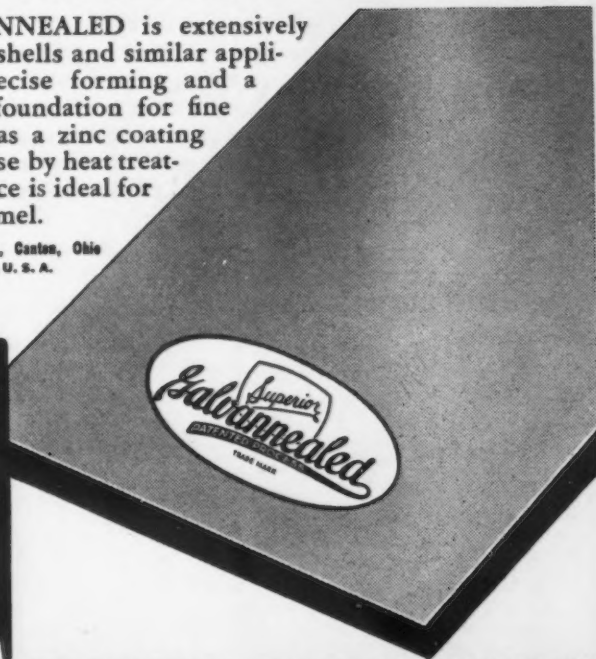
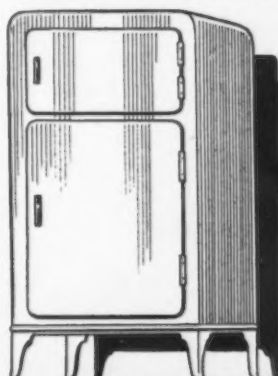
material melts at approximately 2450 deg. F. Silicon recovery is about 85 per cent.

Silicon is a softener and graphitizer—decreases tensile and trans-

For PRECISE FORMING AND FINE FINISHES

SUPERIOR GALVANNEALED is extensively used for refrigerator shells and similar applications requiring precise forming and a highly rust-resistant foundation for fine finishes. This sheet has a zinc coating alloyed to the steel base by heat treatment. Its velvety surface is ideal for paint, lacquer, or enamel.

THE SUPERIOR SHEET STEEL CO., Canton, Ohio
Division of Continental Steel Corp., U. S. A.



verse strengths and chill depending upon the total carbon content.

In discussing silicon, the Cast Metals Handbook says: "A comparatively few years ago the influences of total carbon on cast iron were not well understood by most foundrymen, and carbon control methods were neglected. Silicon was the controlling factor to many foundry mixture makers. Today, through increased knowledge of the effects of carbon content and other factors, silicon contents, while carefully regulated, may vary greatly from those formerly specified. For example, most modern high-test irons are low in total carbon, and in these irons much higher silicon contents are permissible, in fact are needed, than is proper for higher carbon irons."

Titanium

Ferrotitanium additions are generally made in the ladle using 20 mesh material. This alloy contains approximately 16 per cent titanium, with 50 per cent recovery.

ery. It is considered a deoxidizer and graphitizer and reduces chill and graphite flake size. Strength is not increased when titanium alone is added, but some operators have obtained much higher strengths with increased hardness when combining it with chromium—the chromium counteracting the graphitizing effect of the titanium and promoting more sorbitic structures.

Vanadium

The ferralloy is added to the ladle. It contains 35 to 40 per cent vanadium and melts at 2300 to 2550 deg. F. Recovery is estimated to be 85 per cent and 20 mesh size is used.

Vanadium is a deoxidizer and degasifier, increases strength and hardness, refines grain and toughens the iron. It is a carbide forming element, increasing the combined carbon content.

Zirconium

Zirconium may be added to cast iron in the ladle in the form of

silicon-zirconium which contains 40 per cent zirconium and 50 per cent silicon. Its recovery is very low as most of the alloy is used up in its strong deoxidizing and degasifying effect. Zirconium promotes a fine grain structure, increases fluidity and strength and deflection and has a strong graphitizing influence with little decrease in hardness. Tensile strengths of 50,000 lb. per sq. in. have been obtained with 0.30 to 0.50 per cent zirconium, provided the silicon and manganese contents are properly balanced.

Phosphorus

Phosphorus in the form of the ferroalloy, which contains from 18 to 22 per cent phosphorus, is added to the base iron when it is too low in phosphorus. It, like other ferroalloys, is added in lump form in the cupola or in granular form in ladle additions. Among other properties phosphorus adds fluidity without raising the casting temperature to an iron extremely low in total carbon, increases resistance to wear and assists in resistance to heat.

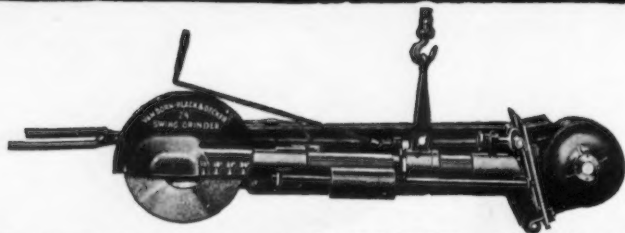
Other alloys such as cobalt, boron, calcium, aluminum, tungsten and cerium are being used with varying success, but are not universally accepted at this time.

The addition of alloys to gray iron is by no means a "cure-all" for the foundryman's problems and should never be considered as such. Thousands upon thousands of tons of good, sound castings are being made with properly balanced mixtures that do not have alloy additions, at least 95 per cent and probably more of the gray iron foundry production of this country (for instance motor blocks) is straight gray iron, made under excellent supervision, of course.

Enormous sums of money are being spent annually in this and other countries in the addition of expensive alloys to gray iron castings when many times a really first-class well-balanced foundry pig iron as a base for the mixture is much better suited.

Table III lists the more commonly used alloys and may be of some help to the foundryman in determining the weight of the alloy to use. It should be remembered that the greatest alloy recovery comes with the hottest iron and by using large mixing ladles.

MARSCHKE HEAVY DUTY GRINDERS AND BUFFERS



THIS illustration shows a MARSCHKE SWING FRAME GRINDER equipped with A.C. motor. It is made in sizes for 12" to 24" wheels. There is also a full line of Marschke Swing Frame Grinders with automatic constant cutting speed regulation for D.C. operation.

These machines are especially desirable for foundries, steel mills and other heavy industries—but Swing Frame Grinders represent only one division of 70 different types and sizes of Marschke Grinders and Buffers. There is a type and size of Marschke for your particular requirements.

A catalog showing all of these machines for wheels, ranging from 10" to 30", and motors from 1 to 25 H. P., will be sent promptly upon request.

VONNEGUT MOULDER CORP.

1807 Madison Avenue, Indianapolis, Ind.

YOU DON'T HAVE TO

Run a Newspaper!

TO GET the latest news delivered to your door each morning, you don't need to operate a news plant with facilities for news-gathering, editing, printing and delivery. Daily, you obtain the news from every corner of the world, without difficulty and at low cost, because your local newspaper—a "cooperative service"—supplies it, not only to you, but also to thousands of other business men.

In a similar way a recognized industrial distributor, identified with the National Industrial Distributors' Foundation, provides a "cooperative service" in your locality that enables you to avoid work and expense in getting the bulk of your industrial supplies and equipment. He maintains complete and specialized facilities which relieve you of time-consuming, costly tasks in meeting plant requirements.

By sharing the valuable facilities of this "cooperative service" with other plants in your neighborhood, you can obtain *what you want, when you want it*, and at a cost that reflects the economies of sharing expenses. It will pay you well to call in the man who wears the N.I.D.F. emblem and plan ways to make full use of his money-saving facilities.

Welcome the Man
...who wears THIS PIN



He represents one of the leading industrial distributors whose ability to render complete "cooperative service" has been verified. He offers these combined facilities for saving you work, worry, money:

1. Expert buying service that "narrows-down" your work of selecting supplies.
2. Superior warehousing facilities that enable you to limit plant stocks, and reduce stock-carrying charges.
3. To-your-door delivery that cuts down shipping and trucking expense.
4. One-source supply which enables you to obtain many items with a single order.
5. An information service that gives you latest unbiased product-and-price data without bother or delay.



NATIONAL INDUSTRIAL DISTRIBUTORS' FOUNDATION



of the Industrial Supply Research Bureau, 7th and Bainbridge Sts., Richmond, Va.; an activity of the National Supply & Machinery Distributors Assn.; Southern Supply & Machinery Distributors Assn.; and American Supply & Machinery Manufacturers Assn.



Problems in the Non-Ferrous Foundry

(CONCLUDED FROM PAGE 47)

caused by the excessive amount of slag forming fluxes added to the metal.

It was recommended that a furnace charge be made up consisting of Ajax ingot metal, gates, borings and the elimination of all fluxes with the exception of a small amount of covering flux, that is, 2 lb. of borax per 1000 lb. heat and the use of 2 oz. of 15 per cent phosphor-copper to each ladle. Subsequent heats produced from this mixture gave very satisfactory results, and the percentage of defective castings was reduced from approximately 20 per cent to not more than 3 or 4 per cent.

In the final discussion with the men at this plant regarding the above unusual practice of using so many fluxes, it was revealed that the 50-50 copper-nickel shot was recommended for the purpose of closing the grain structure; that the boron-copper, phosphor-copper shot and charcoal were used as deoxidizers; that the calcium chloride and salt were recommended to counteract the effect of a possibly high sulphur content in the fuel oil. The lead oxide was recommended for use on the assumption that the porosity was due, not to oxidation, but to the possible presence of reducing gases in the metal.

Oxidation of metal during melting is often responsible for defective castings. In a foundry engaged in the production of mine pump bodies and impellers, considerable difficulty was encountered from porous castings. Composition ingot metal of the formula 75 per cent copper, 15 per cent lead and 10 per cent tin was used for their metal requirements.

The porosity was confined chiefly to large impeller castings, which varied greatly in cross-section. The porosity was found chiefly at the hub or heaviest section of the casting. Small impellers and other castings which were more uniform in cross-section, were produced without any trace of these defects. The porosity appeared to be mainly a surface condition, penetrating to an average depth of approximately $\frac{1}{8}$ in., with a maximum penetration of about $\frac{3}{16}$ in. Examination of one of the large defective

impellers revealed that the porosity occurred only at points where the metal came in contact with the core, and where the metal came in contact with the skin-dried surface of the mold.

It was first thought that the difficulty was due to the use of improperly baked and vented cores. Subsequent experiments failed to support this contention. Attention was then directed to their melting practice. This consisted of melting in natural draft pit furnaces, using hard coal for a bed and coke for around the sides of the crucible. Size No. 100 graphite crucibles were used and the average furnace charge was 500 lb. per heat. All molds were poured direct from the melting crucible.

The melting time per heat was approximately 3 hr. and the metal when in the molten condition appeared to be sluggish and showed an excessive amount of dross and, as a result, constant skimming was necessary to clean the metal thoroughly before pouring.

It was quite evident that the metal was highly oxidized and that the melting practice was at fault. Investigation showed that the area of the flue from the furnace to the stack was 8 x 6 in., or an area of 48 sq. in. This appeared to be too large and not consistent with good furnace design. The flue was therefore reduced to an area of 36 sq. in. and further melts were made. This change in flue area immediately produced good results. Subsequent heats were observed in the molten condition and the metal was clean and free from dross, and had good fluidity. Only a normal amount of skimming was necessary. Examination of several large impellers thus produced revealed that the castings were sound and free from porosity. The solution to this problem may be explained by the metal becoming oxidized in the furnace during melting, because of the excessive area of the flue. This permitted an excessive amount of air to enter the furnace, which was absorbed by the metal. The gas thus absorbed was liberated during solidification of the metal in the mold and, in attempting to escape, was forced to the heaviest section, or that part of the

casting which was last to solidify, this being the section the surface of which was next to the core.

There is no lack of diversity when attempting to list the various things that can happen to metal to cause trouble when these metals are started on their way to become a definite article of commerce, such as valves, bearings, etc.

When a casting is observed containing some defect, a statement of "bad metal" is made in many instances. Although some foundrymen make this statement whenever they get into difficulties, it has been the writer's experience, which covers many years in attempting to solve foundry problems, that when the real difficulties are unearthed, in less than 1 per cent of the cases involved was the trouble due to "bad metal."

In closing, it is apparent that the methods of procedure to be used in the solution of non-ferrous foundry problems resolves itself into the following two general classifications:

(1) A close inspection of a defective casting, together with a study of the foundry practice, will in many cases indicate to the experienced investigator the probable cause of the trouble, and a well directed change in procedure will usually result in the production of sound castings.

(2) When the above method of procedure fails to attain the desired objective, it then becomes necessary to attack the problem by a process of elimination. This first requires the establishment of standard foundry practice, namely, that all phases of production should be the same for every heat, such as character of charge, type of furnace, melting time, pouring temperature, molding practice, etc. By varying only one of these phases at a time, keeping all other conditions constant, and with a study of the results, the cause of the trouble may be narrowed down and finally isolated. Having thus found the cause of the defect, corrective measures can then be applied for its elimination. While such procedure is looked upon by some foundrymen as being impracticable, costly and interfering with production, the time and effort thus expended may be more than compensated for by the savings resulting from the solution of the problem involved.